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BAD WEATHER ACCIDENTS LIKE THESE

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AUTOMOTIVE INDUSTRIES

Published on the 1st and 15th of the month

Vol. 81, No. 9
November 1, 1939

How Much Room Down South?

Appraising Opportunities for Exports to South America—Particularly the Argentine

Astute Winston Churchill has said that the most important contribution the United States can make to civilization, in the present crisis, is to remain prosperous. For the automotive industries, continuing prosperity is statistically—and realistically—dependent upon the maintenance of absorbent export markets. This article isolates and analyzes the possibilities for American automotive exports to portions of South America. Like every appraisal written under changed conditions, it contains "things you never knew 'til now."

By DR. WALTER P. SCHUCK*
PHOTOGRAPHS BY WILLIAM LAVARRE

ARGENTINA is a fruitful field for manufacturers seeking to expand motor vehicle use; it is likewise extremely well suited for the promotion of air traffic. The large "pampa" plains extend hundreds of miles westward from the coast to the Andes Mountains. There are no large rivers which must be crossed, no isolated hills to endanger planes crossing the country. With all these natural automotive advantages Argentina has remained a railway-minded country. The British-owned railways make possible the enormous transports of wheat and corn and linseed eastward and of imported products westward, these being the backbone of Argentina's economic life. As carriers of the nation's wealth, the British railways have acquired a political position which has enabled them to fight first the automobile and later the commercial airplane. A good deal of Argentina's commercial policy has been influenced by the British railways' drive against their American competitors.

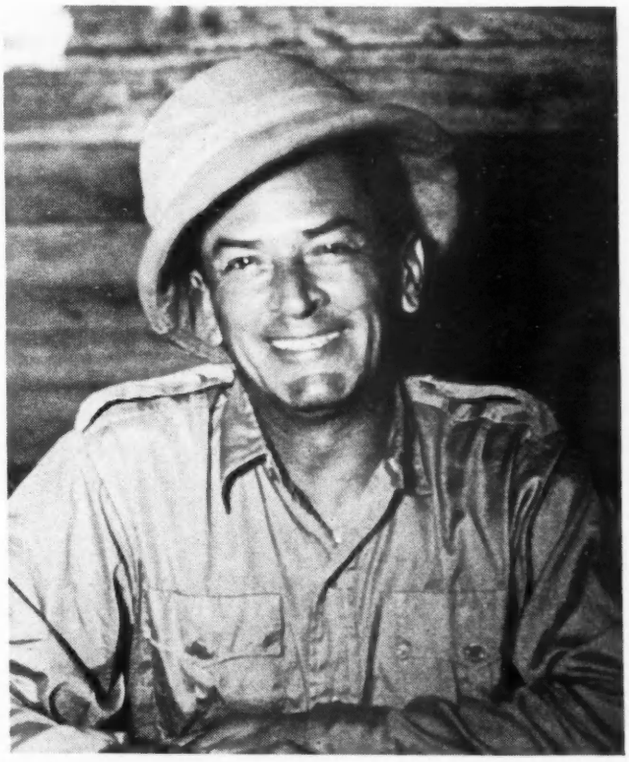
When the war broke out, preparations had been made already for a "coordination" of the Argentine transport system on the same lines that the "coordination" of the country's capital city transport had been planned—conservation of the rail traffic and subordination of highway traffic to the British railways' and British street cars' interests. Right now, taxes on oil have been increased by six centavos to the liter.

Argentina, contrary to Brazil, depends on British purchases of meat and wheat and is thus, or rather has been so far, part of the British economic empire.

*Financial and market analyst. Written from Buenos Aires, especially for AUTOMOTIVE INDUSTRIES.

Contrary also to the situation in neighboring Brazil, the Argentine Association of Automobile Importers follows a hush-hush policy and it is impossible to get detailed figures on automobile imports. The following table shows Brazilian imports for 1938 and the first six months of 1939:

(Turn to next page, please)



Good cause for beaming has Enrico Pimental, Peru's now famous highway engineer. He pioneered and directed the building of the TransAndean highway—a feat thought by many engineers to be impossible. The highway, 700 miles long, crosses a 16,000 ft. pass in the Andes, links the headwaters of the Amazon River with the Pacific Coast and will be a vital factor in the advancement of motor vehicle use in South America.

Brazilian Imports	Jan.-Dec., 1938	Jan.-June, 1939
All passenger cars	12,188	6,612
European cars	1,595	840
Total U. S. makes	10,593	5,772
Buick	372	172
Chevrolet	4,042	1,899
Ford	3,517	2,361
All trucks	8,847	5,286
European trucks	642	400
Total U. S. makes	8,205	4,886
Chevrolet	3,882	2,096
Ford	2,860	1,798

Compared with such detailed figures (which could be also given for other U. S. makes), Argentine figures appear rather poor. As a consequence of drastic import restrictions, Argentine automobile imports, especially those from the United States, were considerably lower during the first six months of the current year than they were one year ago:

January-June	1939	1938
Passenger cars	10,452	23,804
Trucks	1,507	4,487
Chassis for pass. cars	3	3
Bus chassis	40	170
Truck chassis	2,161	5,512
Diesel engines for bus & trucks	56	74

In May of this year, an agreement was reached by which additional imports of motor cars and parts for them from the United States should be secured, the importers agreeing to purchase Argentine dollar-bonds to the amount of approximately four million dollars, and the American exporters agreeing not to sell them before 1940 (25 per cent of the total), 1941 (25 per cent) and 1942 (50 per cent). Little was heard about that scheme and imports of machinery and cars were only 32.636 tons during July and August, 1939, as against 47.847 tons during the corresponding months of 1938.

Figures for 1938 and 1937 reveal that Argentine imports are extremely low when compared with the high degree of civilization in the City of Buenos Aires and with the enormous wealth accumulated in the country. The number of cars in actual use has decreased from about 450,000 in 1930 to only 400,000 at present. At the same time, import duties for the average American car of 1400 kilograms have risen from about 484 Argentine pesos in 1931, to about 1411 pesos at present, including local taxation and exchange control exactions. Consequently, imports have fallen off considerably during recent years as is shown in Table I:

TABLE I

ARGENTINE IMPORTS

	Passenger Cars	Trucks		Passenger Cars	Trucks		Passenger Cars	Trucks
1925	55,798	8,900	1930	35,463	11,966	1935	18,272	8,297
1926	45,643	8,789	1931	10,848	4,555	1936	16,252	8,100
1927	40,023	12,858	1932	4,922	1,004	1937	32,514	16,220
1928	53,063	20,008	1933	7,186	2,639	1938	41,432	13,579
1929	68,859	21,537	1934	11,700	6,831	1939(*)	11,250	3,452

(*)—8 months.

The imports of automobiles and accessories shown in Table II (on page 496) have been registered during 1938 and 1937, detailed figures being available only for the latter year.

Assembly plants in Argentina are operated by General Motors, Ford, International Harvester, and by the Argentine representatives of Dodge, Hudson, and others. Production figures are not tendered for publication.

The latest complete census figures for production of automobiles in the Argentine Republic refer to the situation as of Oct. 31, 1935, but provisional figures are also available for the end of 1937. According to these figures, the number of plants assembling automobiles and trucks and building bodies increased, between 1935 and 1937, from 82 to 111; the number of employees from 3378 to 4456; the amount of wages paid by 63.5 per cent; the amount of raw materials used by 104.2 per cent, and the value of production by 100.5 per cent. The more complete figures for Oct. 31, 1935, demonstrated that out of a total of 82 factories, 50 were in the City of Buenos Aires, 15 in the Province of Buenos Aires, 7 each in the Provinces of Mendoza and Santa Fe and one each in the Provinces of Corrientes and San Juan and in the Misiones Territory.

Raw materials used during the period between July 1, 1934, and June 30, 1935, were estimated as follows, the value of the "free" peso during this period corresponding roughly to 30 cents.

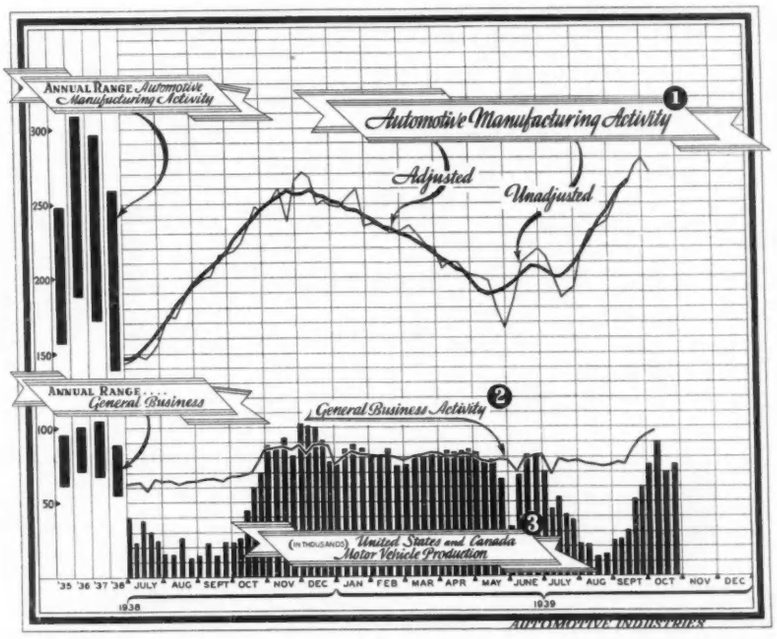
(*Turn to page* 496)

The Brass-Hat Rack

"They say they wonder why they never thought to put the arm rests on the outside years ago!"

BUSINESS IN BRIEF

Our own view of automotive production and sales; authoritative interpretation of general conditions



Weekly indexes of automotive general business charted

Strikes Disrupt Schedules

PRODUCTION schedules of the car and truck manufacturing plants for the latter half of October continued to be seriously disrupted by major delays and work stoppages resulting from strikes and labor disputes. Consequently estimates[3] of production based on projected schedules for this period must necessarily be tentative.

In spite of notable increases in output achieved by Chevrolet and Ford during the week ending Oct. 21, the industry's total production for the week showed little gain over that of the previous week because of almost complete stoppage of production of passenger cars in all Chrysler plants together with a continuance of the strike in Nash plants which eliminated both of these manufacturers as contributors to the total. Where production for the week might have been close to 90,000 cars and trucks it probably did not exceed 70,000.

Similarly production for the week ending Oct. 28 was entirely dependent on whether Chrysler and Nash plants would resume operations, which in turn was dependent on early settlement of their current labor disputes. Without final assemblies being completed by these manufacturers, production for the week is estimated at better than 75,000 cars and trucks while it could have been close to 100,000.

Although production during October was affected unfavorably by these labor difficulties they appeared to be the only adverse factor confronting the industry currently. Sales reports on a wide national front, as well as those emanating from the National Automobile Show in New York, bear out earlier predictions of industry leaders that the 1940 models would earn an acceptance that would continue the improvement in business that has been in progress since earlier in the year.

Typical of the optimistic reports being heard in late October were those issued by Ford, Buick and Hudson executives. J. R. Davis, general sales manager, Ford Motor Co., announced that his company's program was based on a 30 per cent improvement in sales over 1939, which in turn had shown a gain of 55 per cent over 1938. The company expects to build more than a quarter million Ford, Mercury, and Lincoln-Zephyr cars before the end of 1939 and has projected 900,000 vehicles for its 1940 model year.

G. H. Pratt, general sales manager, Hudson Motor Co., announced that retail sales of Hudson cars for the first half of October totaled 3432 units, the best first half of October since 1929.

Sales of Buick cars at the National Automobile Show in New York were out-running last year by two to one, according to W. F. Hufstader, general sales manager. As of Oct. 10, Buick dealers had on hand 28,554 unfilled firm orders for 1940 models, the highest backlog of orders in the company's history.

AUTOMOTIVE MANUFACTURING ACTIVITY soared to an unadjusted index level of 279 for the week ended Oct. 7 and dropped nine points to 270 in the week ended Oct. 14. The adjusted index which is plotted on the above chart continued its upward climb during the weeks ended Sept. 16 and Sept. 23 to levels of 260 and 265, respectively.

GENERAL BUSINESS ACTIVITY: The summary, prepared for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., will be found in this issue on page 504.

[1] 1923 average = 100; [2] Prepared by Administrative and Research Corp., New York. 1926 = 100; [3] Estimated by J. A. Laansma, Detroit News Editor, AUTOMOTIVE INDUSTRIES.

General and Engine Specifications

Line Numbers	PASSENGER CAR MAKE AND MODEL	Wheelbase (In.)	Tread (In.) Front	Tread (In.) Rear	Overall Length with Bumper (In.)	Shipping Weight (Lb.) Cheapest 5 Pass., 4 door Sedan or equivalent	Tire Size (In.)	Gear Ratio 5 Pass., 4 door Sedan	ENGINE: No. of Cylinders, Bore and Stroke (In.)	Valve Arrangement	Cylinder Arrangement	Cylinder Head Material	Piston Displacement (Cu. In.)	Taxable Horsepower	Maximum Brake Hp. at Specified R.P.M.	Maximum Torque (Lb.-Ft.) at Specified R.P.M.	Compression Ratio (to-1) Standard	Compression Ratio (to-1) Optional	Compression Pressure (Lb.) Pressure	Compression Pressure (Lb.) At What R.P.M.	Weight per Cu. In.* 5 Pass. 4 door Sedan	Weight per Hp.* 5 Pass. 4 door Sedan	Hp. per Cu. In.	Crankshaft Revolutions per Mile	Displacement Factor †	Line Numbers
1	Bantam 65	75	39 1/8	42 1/2	129 1/2	1261	4.00/15	5.25	4-2.26x3 1/8	L	IL	CI	50.14	8.2	22-3800	34-3200	7.40	No	135	200	35.12	80.04	.44	4735	.....	1
2	Buick-Special 40-40	121	58 3/32	59 3/32	203 13/16	3660	6.50/16	4.40	8-3 3/32x4 1/8	I	IL	CI	248.0	30.6	107-3400	203-2000	6.10	.....	112	CS	16.70	38.80	.43	3190	37.0	2
3	Buick-Super 40-50	121	58 3/32	59 3/32	208 13/16	3790	6.50/16	4.40	8-3 3/32x4 1/8	I	IL	CI	248.0	30.6	107-3400	203-2000	6.10	.....	112	CS	17.30	40.00	.43	3190	35.8	3
4	Buick-Century 40-60	126	58 3/32	59 3/32	208 13/16	3935	7.00/15	3.90	8-3 3/32x4 1/8	I	IL	CI	320.2	37.8	141-3600	269-2000	6.25	.....	114	CS	13.80	31.40	.44	2839	39.8	4
5	Buick-Roadmaster 40-70	126	58 3/32	59 3/32	213 3/8	4045	7.00/15	3.90	8-3 1/8x4 1/8	I	IL	CI	320.2	37.8	141-3600	269-2000	6.25	.....	114	CS	14.20	32.20	.44	2839	38.8	5
6	Buick-Limited 40-80	133	59 1/32	62 1/2	219	4400	7.50/16	4.18	8-3 1/8x4 1/8	I	IL	CI	320.2	37.8	141-3600	269-2000	6.25	.....	114	CS	15.30	34.80	.44	2847	36.3	6
7	Buick-Limited 40-90	140	59 1/16	62 1/2	225 1/2	4590	7.50/16	4.55	8-3 1/8x4 1/8	I	IL	CI	320.2	37.8	141-3600	269-2000	6.25	.....	114	CS	15.90	36.10	.44	3076	37.6	7
8	Cadillac-V8 40-60S	127	58	61	216 7/8	4070	7.00/16	3.92	8-3 1/2x4 1/2	L	V	CI	346.0	39.2	135-3400	250-1700	6.25	.....	155	1000	13.20	33.85	.39	2748	40.1	8
9	Cadillac-V8 40-62	129	58	59	215 13/16	.....	7.00/16	3.92	8-3 1/2x4 1/2	L	V	CI	346.0	39.2	135-3400	250-1700	6.25	.....	155	1000	.....	.....	.39	2748	.....	9
10	Cadillac-V8 40-72	139	58	62 1/2	227 1/16	.....	7.50/16	4.31	8-3 1/2x4 1/2	L	V	CI	346.0	39.2	140-3400	270-1700	6.70	.....	170	1000	.....	.....	.40	2914	.....	10
11	Cadillac-V8 40-75	141	60 1/2	62 1/2	228 7/16	5045	7.50/16	4.58	8-3 1/2x4 1/2	L	V	CI	346.0	39.2	140-3400	270-1700	6.70	.....	170	1000	16.00	39.50	.40	3096	37.6	11
12	Cadillac-V16 40-90	141	60 1/2	62 1/2	225 13/16	.....	7.50/16	4.31	16-3 1/2x3 1/4	L	V	CI	431.0	67.6	185-3600	324-1700	6.75	.....	180	1000	.....	.....	.43	2914	.....	12
13	Chevrolet-Master 85	113	56 3/8	59	192 1/4	2960	6.00/16	3.73	6-3 1/2x3 3/4	I	IL	CI	216.5	29.4	85-3200	.....	6.25	No	.....	.....	15.98	40.70	.39	2780	33.6	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	113	57 5/8	59	192 1/4	3060	6.00/16	4.11	6-3 1/2x3 3/4	I	IL	CI	216.5	29.4	85-3200	.....	6.25	No	.....	.....	16.44	41.88	.39	3067	36.1	14
15	Chrysler-Windsor & Royal C-25	122 1/2	57	60 3/4	202 1/2	3175	6.25/16	3.90	6-3 3/8x4 1/2	L	IL	CI°	241.5	27.3	108-3600	188-1200	6.50	7.00	145	1000	15.21	34.02	.45	2870	36.6	15
16	Chrysler-Saratoga & N. Y. C-26	128 1/2	57 7/16	61 5/16	208 1/2	3590	7.00/15	3.91	8-3 1/4x4 7/8	L	IL	CI°	323.5	33.8	135-3400	255-1600	6.80	7.45	155	1000	12.64	30.29	.42	2846	43.7	16
17	Chrysler-Crown Imperial C-27	145 1/2	57 7/16	61 1/8	225 1/2	.....	7.50/15	4.55	8-3 1/4x4 7/8	L	IL	AI	323.5	33.8	137-3400	260-1600	6.80	7.45	155	1000	.....	.....	.42	3285	.....	17
18	Crosley A	80	40	40	120	950	4.25/12	5.14	2-3x2 3/4	L	OP	CI	38.8	7.2	15-4200	22-2400	5.50	.....	90	CS	37.37	98.66	.39	5191	.....	18
19	DeSoto-Custom S-7	122 1/2	57	60 3/4	202 1/4	3086	6.00/16	4.10	6-3 3/8x4 1/4	L	IL	CI°	228.1	27.3	100-3600	176-1200	6.50	7.00	147	1000	15.72	35.86	.44	3055	37.6	19
20	Dodge D-14-17	119 1/2	57	60 3/4	198 1/4	2997	6.00/16	4.10	6-3 1/4x4 3/8	L	IL	CI	217.8	25.3	87-3600	166-1200	6.50	.....	145	1000	16.05	40.19	.40	3055	36.8	20
21	Ford V8-60	112	55 3/4	58 1/4	190.86	2696	5.50/16	4.44	8-2.6x3.2	L	V	AI	136.0	21.6	60-3500	94-2500	6.60	.....	158	2800	24.20	54.90	.44	3419	28.1	21
22	Ford V8-85	112	55 3/4	58 1/4	190.86	2936	5.50/16	3.78	8-3.062x3.75	L	V	CI	221.0	30.0	85-3800	150-2200	6.15	.....	140	2400	15.52	40.40	.38	2911	36.2	22
23	Graham-DeL. & Custom 108	120	58 1/2	60 1/4	.....	.....	6.00/16	4.27	6-3 1/4x4 3/8	L	IL	CI	217.8	25.3	92-3800	170-1600	6.65	7.10	125	CS	17.10	40.3	.43	3181	.....	23
24	Graham-Sch. & Cus. Sch. 107	120	56 1/2	60 1/4	.....	.....	6.25/16	4.27	6-3 1/4x4 3/8	L	IL	CI	217.8	25.3	120-4000	182-2400	6.65	7.10	130	CS	17.35	31.5	.54	3143	.....	24
25	Hudson-Six 40	113	56 5/8	59 1/2	190 3/8	2940	(d)	4.56	6-3x4 1/8	L	IL	CI	175.0	21.6	92-4000	138-1400	7.00	.....	125	125	19.65	37.39	.53	3397	33.5	25
26	Hudson-Super & C. C. Six 41-43	118-125	56 5/8	59 1/2	(e)	3050	(f)	4.11	6-3x5	L	IL	CI	212.0	21.6	102-4000	168-1200	6.50	.....	120	125	(1)	(2)	.48	(3)	35.4	26
27	Hudson-Eight & C. C. Eight 44-47	118-125	56 5/8	59 1/2	(e)	.....	(g)	4.11	8-3x4 1/2	L	IL	CI	254.0	28.8	128-4200	198-1600	6.50	.....	119	125	(4)	(5)	.50	(6)	.....	27
28	La Salle 40-50, 40-52	123	58	59	(a)	3825	7.00/16	3.92	8-3 3/8x4 1/2	L	V	CI	322.0	36.4	130-3400	234-1800	6.25	.....	155	1000	13.42	33.25	.40	2764	39.9	28
29	Lincoln V12	136-145	60	60	.....	.....	7.50/17	4.58	12-3.125x4.5	L	V	AI	414.0	46.8	150-3400	312-1200	6.38	.....	138	1000	15.06	41.50	.36	.....	38.5	29
30	Lincoln-Zephyr V12	125	55 1/2	58 1/4	209.5	3620	7.00/16	4.44	12-2.875x3.75	L	V	AI	292.0	39.6	120-3500	.....	7.20	.....	.....	.....	14.11	34.35	.41	3130	43.0	30
31	Mercury V8-95	116	55 3/4	58 1/4	195.75	3103	6.00/16	3.54	8-3.187x3.75	L	V	CI	239.0	32.5	95-3600	170-2100	6.15	.....	145	2200	15.08	37.90	.40	2637	33.8	31
32	Nash-LaFayette 4010	117	56 7/8	60 1/4	199 1/16	3350	6.00/16	4.10	6-3 3/8x4 3/8	I	IL	CI	234.8	27.3	99-3400	179-1200	6.30	No	110	CS	16.40	38.88	.42	3054	36.2	32
33	Nash-Ambassador 6 4020	121	56 7/8	60 1/4	203 1/16	3500	6.25/16	4.10	6-3 3/8x4 3/8	I	IL	CI	234.8	27.3	105-3400	190-1050	6.00	No	125	350	17.03	38.09	.45	3018	34.4	33
34	Nash-Ambassador 8 4080	125	57 1/16	61 3/8	207 1/16	3775	7.00/15	4.10	8-3 1/2x4 1/4	L	IL	CI	260.8	31.2	115-3400	200-1200	6.00	No	110	350	16.39	37.17	.44	2890	34.2	34
35	Oldsmobile-Six 60	116	58	59	197 3/4	3100	6.00/16	4.10	6-3 7/16x4 1/8	L	IL	CI	229.7	28.4	95-3400	180-1400	6.10	5.61	146	1000	15.66	37.90	.41	3054	37.8	35
36	Oldsmobile-Six 70	120	58	59	199 3/4	3220	6.50/16	4.30	6-3 7/16x4 1/8	L	IL	CI	229.7	28.4	95-3400	180-1400	6.10	5.61	146	1000	16.13	39.1	.41	3117	37.8	36
37	Oldsmobile-Custom 8 Cruiser	124	58	59	210 3/4	3555	7.00/15	4.30	8-3 3/8x3 7/8	L	IL	CI	257.1	33.8	110-3600	200-2000	6.20	5.80	152	1000	15.69	36.6	.43	3130	37.2	37
38	Packard-One Ten 1800	122	59 3/16	60 1/2	196 1/8	3200	6.25/16	4.30	6-3 1/2x4 1/4	L	IL	CI	245.0	29.4	100-3200	195-1200	6.39	6.71	.....	.....	15.10	37.00	.41	3165	40.5	38
39	Packard-One Twenty 1801	127	59 3/16	60	200 5/8	3520	6.50/16	4.09	8-3 1/4x4 1/4	L	IL	CI	282.0	33.8	120-3600	225-1700	6.41	6.85	.....	.....	14.25	33.50	.42	2965	40.3	39
40	Packard-Super Eight 1803-4-5	127-38-48	59 3/16	62 1/2	(b)	3855	7.00/16	(c)	8-3 1/2x4 5/8	L	IL	CI	356.0	39.2	160-3500	292-1800	6.45	6.85	.....	.....	12.23	27.21	.45	(7)	43.8	40
41	Packard-Cus. Sup. Eight 1806-7-8	127-38-48	59 3/16	62 1/2	(b)	4210	7.00/16	(c)	8-3 1/2x4 5/8	L	IL	CI	356.0	39.2	160-3500	292-1800	6.45	6.85	.....	.....	13.23	29.43	.45	(7)	40.0	41
42	Plymouth-Roadking P-9	117 1/2	57	59 1/16	194 1/2	2869	5.50/16	3.90	6-3 1/2x4 3/8	L	IL	CI°	201.3	23.4	84-3600	154-1200	6.70	7.00	147	1000	16.73	40.10	.42	3003	34.6	42
43	Plymouth-DeLuxe P-10	117 1/2	57	59 1/16	194 1/2	2924	6.00/16	4.10	6-3 1/2x4 3/8	L	IL	CI°	201.3	23.4	84-3600	154-1200	6.70	7.00	147	1000	17.00	40.76	.42	3054	34.8	43
44	Pontiac-Special 6 40-25	117	58	59	198 3/4	3170	6.00/16	4.30	6-3 7/16x4	L	IL	CI	222.7	28.3	87-3520	164-1400	6.50	.....	156	1000	16.47	42.18	.39	3203	37.7	44
45	Pontiac-DeLuxe 6 40-26	120	58	59	199 3/4	3210	6.00/16	4.30	6-3 7/16x4	L	IL	CI	222.7	28.3	87-3520	164-1400	6.50	.....	156	1000	16.65	42.64	.39	3203	37.2	45
46	Pontiac-DeLuxe 8 40-28	120 1/4	58	59	200	.....	6.50/16	4.30	8-3 1/4x3 3/4	L	IL	CI	248.9	33.8	100-3700	175-1600	6.50	.....	152	1000	15.80	39.3	.40	3117	.....	46
47	Pontiac-Torpedo 8 40-29	121 1/2	58	59	207 1/2	.....	6.50/16	4.30	8-3 1/4x3 3/4	L	IL	CI	248.9	33.8	100-3700	175-1600	6.50	.....	152	1000	16.60	40.1	.40	3117	.....	47
48	Studebaker-Champion 6 2G	.....	56 1/4	57	188 3/4	2365	5.50/16	4.56	6-3x3 7/8	L	IL	CI	164.3	21.6	78-4000	128-1600	6.50	.....	105	150	17.43	36.73	.47	3497	38.9	48
49	Studebaker-Commander 6 10A	.....	59 1/8	61	197 1/2	.....	6.25/16	4.55	6-3 1/16x4 3/8	L	IL	CI	226.0	26.3	90-3400	174-1200	6.00	7.00	105	150	16.30	41.2	.40	3349	.....	49
50	Studebaker-President 8 6C	.....	59 3/4	61	203	.....	6.50/16	4.55	8-3 1/16x4 1/4	L	IL	CI	250.0	30.0	110-3600	195-2000	6.00	6.50	105	150	15.73	35.8	.43	3299	.....	50
51	Willys 440	102	55 1/4	56 1/4	181	.....	5.50/16	4.55	4-3 1/8x4 3/8	L	IL	CI	134.2	15.6	61-3600	106-2200	6.48	6.81	111	185	.....	.....	.45	3504	.....	51

ABBREVIATIONS:
*—Performance data calculated on basis of shipping weight plus 500 lbs.
°—Aluminum at extra cost
(a)—Model 50—206 3/4 inches; Model 52—210 7/8 inches
(b)—Model 1803—201 1/4; 1804—212 1/4; 1805—222 1/4 Model 1806—205 7/8; 1807—216 7/8; 1808—226 7/8
(c)—Models 1803-1806—3.92; 1804-1807—4.09; 1805-1808—4.36
(d)—Traveler, 5.50/16; De Luxe, 6.00/16
(e)—Super Six—195 3/8; Country Club 6—202 3/8
(f)—Super Six—6.00/16; Country Club 6—6.25/16
(g)—Eight—6.00/16; Country Club 8—6.50/16
(1)—16.74 lbs. on 41; 17.64 lbs. on 43
(2)—34.8 lbs. on 41; 36.7 lbs. on 43
(3)—3062 for 41; 3025 for 43
(4)—14.50 lbs on 44; 14.90 lbs. on 47
(5)—28.78 lbs. on 44; 29.57 lbs. on 47
(6)—3062 for 44; 2980 for 47
(7)—2703 for 1803 and 1806; 2834 for 1804 and 1807; 3021 for 1805 and 1808
Al—Aluminum
CI—Cast Iron
CS—Cranking speed
I—In head
IL—In line
L—L-Head
No—No or None
OP—Opposed
V—Vee-Type

†—Calculated on basis of rear axle ratio, displacement, shipping weight plus 500 lb and effective tire diameter.

Pistons, Rings, Connecting Rods

Line Numbers	PASSENGER CAR MAKE AND MODEL	Number of Cylinders, Bore and Stroke	PISTON									PISTON RINGS								WRIST PIN				CONNECTING RODS			Line Numbers
			Make	Material	Features	Weight (Oz.) Without Rings, Pin or Bushing	Length (In.)	Clearance—Average (In.)		Ring Groove Depth (In.)		Oil				Compression				Length (In.)	Diameter (In.)	Locked in.	Average Clearance (In.)	Length (In.)—Center to Center	Material (S. A. E. No.)	Weight (Oz.)	
								Top Land	Bottom of Skirt	Oil	Compression	Number Used	Width (In.)	Average Gap (In.)	Maximum Wall Thickness (In.)	Number Used	Width (In.)	Average Gap (In.)	Maximum Wall Thickness (In.)								
1	Bantam 65	4-2.26x3 1/8	BA	Als	Ss,Tp	5.12	2.08	.0197	.0010	.118	.118	1	.1237	.009	.110	2	.093	.015	.105	1 1/16	13/32	R	.0001	5 3/4	1045	.....	1
2	Buick-Special 40-40	8-3 1/2x4 1/8	A-B	Al	Ts,C,An	14.24	4 3/32	.0265	.0018	.166	.166	2	1/16	.012	.140	2	1/32	(x)	(y)	2 1/16	13/32	R	.00035	7 5/8	1045	30.74	2
3	Buick-Super 40-50	8-3 1/2x4 1/8	A-B	Al	Ts,C,An	14.24	4 3/32	.0265	.0018	.166	.166	2	1/16	.012	.140	2	1/32	(x)	(y)	2 1/16	13/32	R	.00035	7 5/8	1045	30.74	3
4	Buick-Century 40-60	8-3 1/2x4 1/2	A-B	Al	Ts,C,An	17.28	4 1/16	.0295	.0020	.179	.179	2	1/16	.012	.150	2	1/32	(x)	(z)	3 1/16	1/2	R	.00035	8 1/4	1045	37.98	4
5	Buick-Roadmaster 40-70	8-3 1/2x4 1/2	A-B	Al	Ts,C,An	17.28	4 1/16	.0295	.0020	.179	.179	2	1/16	.012	.150	2	1/32	(x)	(z)	3 1/16	1/2	R	.00035	8 1/4	1045	37.98	5
6	Buick-Limited 40-80	8-3 1/2x4 1/2	A-B	Al	Ts,C,An	17.28	4 1/16	.0295	.0020	.179	.179	2	1/16	.012	.150	2	1/32	(x)	(z)	3 1/16	1/2	R	.00035	8 1/4	1045	37.98	6
7	Buick-Limited 40-90	8-3 1/2x4 1/2	A-B	Al	Ts,C,An	17.28	4 1/16	.0295	.0020	.179	.179	2	1/16	.012	.150	2	1/32	(x)	(z)	3 1/16	1/2	R	.00035	8 1/4	1045	37.98	7
8	Cadillac-V8 40-60S	8-3 1/2x4 1/2	A-B	Al	Ts,An	18.30	4 1/16	.0196	.0021	.160	(a)	2	1/16	.011	.150	2	(b)	.010	(c)	3 1/16	1/2	F	(d)	8 3/4	1035	37.47	8
9	Cadillac-V8 40-62	8-3 1/2x4 1/2	A-B	Al	Ts,An	18.30	4 1/16	.0196	.0021	.160	(a)	2	1/16	.011	.150	2	(b)	.010	(c)	3 1/16	1/2	F	(d)	8 3/4	1035	37.47	9
10	Cadillac-V8 40-72	8-3 1/2x4 1/2	A-B	Al	Ts,An	18.30	4 1/16	.0196	.0021	.160	(a)	2	1/16	.011	.150	2	(b)	.010	(e)	3 1/16	1/2	F	(d)	8 3/4	1035	37.47	10
11	Cadillac-V8 40-75	8-3 1/2x4 1/2	A-B	Al	Ts,An	18.30	4 1/16	.0196	.0021	.160	(a)	2	1/16	.011	.150	2	(b)	.010	(e)	3 1/16	1/2	F	(d)	8 3/4	1035	37.47	11
12	Cadillac-V16 40-90	16-3 1/4x3 1/4	A-B	Al	Ts,An	15.28	3 3/4	.0196	.0017	.160	.159	1	1/16	.011	.145	2	(b)	.011	(e)	2 13/16	11/16	R	.00035	6 5/8	1340	24.53	12
13	Chevrolet-Master 85	6-3 1/2x3 3/4	Own	CI	Tp,Ss,O	.....	3 3/32	.0165	.0020	.178	.158	1	.1862	.010	.155	2	.1237	.010	.156	3.150	.865	R	PF	6 1/2	DF	28.3	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	6-3 1/2x3 3/4	Own	CI	O,Tp,Ss	.....	3 3/32	.0165	.0020	.178	.158	1	.1862	.010	.155	2	.1237	.010	.156	3.150	.865	R	PF	6 1/2	DF	28.3	14
15	Chrysler-Windsor & Royal C-25	6-3 5/8x4 1/2	.....	Al	Us,C,Tp	17.50	3 7/8	.0115	(h)	.177	.157	2	1/16	.011	.145	2	1/16	.011	(i)	2 7/8	13/32	F	.00005	7 1/8	HMS	33.9[1]	15
16	Chrysler-Saratoga & N. Y. C-26	8-3 1/4x4 7/8	.....	Al	Us,C,Tp	16.30	3 7/8	.0110	(h)	.177	.157	2	1/16	.011	.145	2	1/16	.011	(i)	2 3/4	13/32	F	.00005	9	HMS	37.3[1]	16
17	Chrysler-Crown Imperial C-27	8-3 1/4x4 7/8	.....	Al	Us,C,Tp	16.30	3 7/8	.0110	(h)	.177	.157	2	1/16	.011	.145	2	1/16	.011	(i)	2 3/4	13/32	F	.00005	9	HMS	37.3[1]	17
18	Crosley A	2-3x2 3/4	.....	EI	Plain	16.00	2 3/4	.0130	.0047	.169	.149	1	1/16	.010	.135	2	1/16	.010	.135	2 3/4	.624	P	TP	4 5/8	1045	12.5	18
19	DeSoto-Custom S-7	6-3 5/8x4 1/4	.....	Al	Us,C,Tp	17.50	3 7/8	.0115	(h)	.177	.157	2	1/16	.011	.145	2	1/16	.011	(i)	2 7/8	13/32	F	.00005	8	HMS	35.2[1]	19
20	Dodge D-14-17	6-3 1/4x4 3/8	A-A	Als	Ss,C,At	15.20	3 1/4	.0110	(l)	.177	.157	2	1/16	.011	.145	2	1/16	.011	(i)	2 9/16	11/16	F	PF	7 1/4	HMS	30.4[1]	20
21	Ford V8-60	8-2.6x3.2	Own	CS		8.12	.....	.....	.....	.....	.....	1	.1550	.010	.....	2	.0917	.010	.....	2.355	11/16	F	.0004	6 5/8	DF	9.92	21
22	Ford V8-85	8-3.06x3.75	Own	CS		12.00	.....	.....	.....	.....	.....	1	.1575	.015	.....	2	(aa)	.015	.....	2.847	3/4	F	.0004	7	DF	16.80	22
23	Graham-DeL. & Custom 108	6-3 1/4x4 3/8	BA	Als	O,Tp,At	14.12	3 5/8	.0240	.0025	.177	.157	2	1/16	.011	.150	2	1/16	.011	.150	2 1/16	11/16	R	.0005	7	1035	26.00	23
24	Graham-Sch. & Cus. Sch. 107	6-3 1/4x4 3/8	BA	Als	O,Tp,At	14.12	3 5/8	.0240	.0025	.177	.157	2	1/16	.011	.150	2	1/16	.011	.150	2 1/16	11/16	R	.0005	7	1035	26.00	24
25	Hudson-Six 40	6-3x4 1/8	AC	Al	C,Ts	10.50	3 1/16	.0160	.0007	.148	.148	2	(v)	.010	.128	2	1/16	.010	.123	2 1/16	3/4	F	SF	8 5/8	DF	31.3	25
26	Hudson-Super & C. C. Six 41-43	6-3x5	AC	Al	C,Ts	10.50	3 1/16	.0160	.0007	.148	.148	2	(v)	.010	.128	2	1/16	.010	.123	2 1/16	3/4	F	SF	8 1/16	DF	31.3	26
27	Hudson-Eight & C. C. Eight 44-47	8-3x4 1/2	AC	Al	C,Ts	10.50	3 1/16	.0160	.0007	.148	.148	2	(v)	.010	.128	2	1/16	.010	.123	2 1/16	3/4	F	SF	8 1/16	DF	31.3	27
28	La Salle 40-50, 40-52	8-3 5/8x4 1/2	L-B	Al	Ts,An	16.88	4 1/16	.0230	.0013	.163	(f)	2	1/16	.011	.150	2	(b)	.010	(g)	2 1/16	7/8	F	(d)	8 3/4	1035	37.47	28
29	Lincoln V12	12-3.125x4 1/2	AC	Al	An,Ts,C	12.50	3 1/8	.....	.....	.166	.147	2	.1847	.011	.140	2	.1237	.012	.125	3	1/8	P	.0005	10 1/16	DF	38.00	29
30	Lincoln-Zephyr V12	12-2.875x3.75	Own	CS		.....	.....	.....	.....	.....	.....	1	.1847	.010	.....	2	.0932	.010	.....	.....	.....	.....	.....	.....	.....	.....	30
31	Mercury V8-95	8-3.187x3.75	Own	CS		13.94	.....	.....	.....	.....	.....	1	.1570	.015	.....	2	(aa)	.015	.....	2.847	3/4	F	.0004	7	DF	17.75	31
32	Nash-LaFayette 4010	6-3 5/8x4 3/8	BI	Als	Ss,Tp,At	.....	3 7/8	.....	.0015	.175	.155	2	.155	.014	.145	2	.124	.015	.145	2.80	.874	F	SF	8 3/4	Steel	36.25	32
33	Nash-Ambassador 6 4020	6-3 5/8x4 3/8	BA	Als	Ss,Tp,At	19.25	3 7/8	.....	.0015	.175	.155	2	.155	.014	.145	2	.124	.015	.145	2.80	.874	F	SF	8 3/4	Steel	36.25	33
34	Nash-Ambassador 8 4080	8-3 1/16x4 1/4	BA	Als	Ss,Tp,At	16.00	3 1/16	.....	.0015	.175	.156	2	(m)	.014	.130	2	.124	.015	.140	2.57	.874	F	SF	8 3/4	Steel	34.00	34
35	Oldsmobile-Six 60	6-3 1/16x4 1/2	AC	Al	An,Ts,C	17.75	4 1/16	.026	.0015	.187	.171	2	1/16	.011	.150	2	1/32	.013	.160	3 1/16	13/32	P	.00045	7 1/16	HMS	29.60	35
36	Oldsmobile-Six 70	6-3 1/16x4 1/2	AC	Al	An,Ts,C	17.75	4 1/16	.026	.0015	.187	.171	2	1/16	.011	.150	2	1/32	.013	.160	3 1/16	13/32	P	.00045	7 1/16	HMS	29.60	36
37	Oldsmobile-Custom 8 Cruiser	8-3 1/16x3 7/8	AC	Al	An,Ts,C	16.00	3 1/16	.026	.0015	.156	.140	2	1/16	.011	.150	2	1/32	.011	.150	2 13/16	13/32	P	.00045	7 1/16	HMS	29.60	37
38	Packard-One Ten 1800	6-3 1/16x4 1/4	Al	Als	At,C,Tp	20.75	3 7/8	.....	.0010	.1817	(n)	1	.1862	.011	.126	2	.1242	.012	(p)	3 5/16	1/2	F	FP	7 1/16	DF	31.60	38
39	Packard-One Twenty 1801	8-3 1/16x4 1/4	Al	Als	At,C,Tp	17.25	3 7/8	.....	.0010	.1762	(o)	1	.1862	.011	.125	2	.1242	.012	(r)	2 15/16	1/2	F	FP	7 1/16	DF	31.60	39
40	Packard-Super Eight 1803-4-5	8-3 1/16x4 5/8	Al	Als	At,C,Tp	20.75	3 7/8	.....	.0010	.1817	(n)	1	.1862	.011	.126	2	.1242	.012	(p)	3 5/16	1/2	F	FP	9 1/4	DF	42.00	40
41	Packard-Cus. Sup. Eight 1806-7-8	8-3 1/16x4 5/8	Al	Als	At,C,Tp	20.75	3 7/8	.....	.0010	.1817	(n)	1	.1862	.011	.126	2	.1242	.012	(p)	3 5/16	1/2	F	FP	9 1/4	DF	42.00	41
42	Plymouth-Roadking P-9	6-3 1/16x4 3/8	.....	Al	Us,C,Tp	14.40	3 1/16	.0110	(s)	.171	.151	2	1/16	.011	.145	2	1/16	.011	(t)	2 5/8	11/16	F	.0001	7 1/16	HMS	30.7[1]	42
43	Plymouth-DeLuxe P-10	6-3 1/16x4 3/8	.....	Al	Us,C,Tp	14.40	3 1/16	.0110	(s)	.171	.151	2	1/16	.011	.145	2	1/16	.011	(t)	2 5/8	11/16	F	.0001	7 1/16	HMS	30.7[1]	43
44	Pontiac-Special 6 40-25	6-3 7/16x4	Own	CNI	Tp	27.12	3 27/32	.0235	.0020	.189	.169	1	1/16	.012	.150	2	1/32	.011	.155	3 1/16	11/16	P	PF	7 1/16	DF	36.96	44
45	Pontiac-DeLuxe 6 40-26	6-3 7/16x4	Own	CNI	Tp	27.12	3 27/32	.0235	.0020	.189	.169	1	1/16	.012	.150	2	1/32	.011	.155	3 1/16	11/16	P	PF	7 1/16	DF	36.96	45
46	Pontiac-DeLuxe 8 40-28	8-3 1/16x3 3/4	Own	CNI	Tp	24.62	3 15/16	.0235	.0020	.189	.169	1	1/16	.012	.150	2	1/32	.011	.150	2 7/8	11/16	P	PF	7 1/16	DF	31.68	46
47	Pontiac-Torpedo 8 40-29	8-3 1/16x3 3/4	Own	CNI	Tp	24.62	3 15/16	.0235	.0020	.189	.169	1	1/16	.012	.150	2	1/32	.011	.150	2 7/8	11/16	P	PF	7 1/16	DF	31.68	47
48	Studebaker-Champion 6 2G	6-3x3 7/16	AC	Al	Ss,Tp,O	8.96	2 15/16	.0165	.0015	.1635	.1635	1	1/16	.012	.135	2	(b)	.012	(u)	2 5/8	3/4	R	.0002	6 1/16	DF	20.96	48
49	Studebaker-Commander 6 10A	6-3 1/8x4 3/8	AC	Al	Ts,C,Tp	14.40	3 3/4	.0175	.0015	.1875	.1505	1	1/16	.011	.145	2	1/16	.012	.145	2 7/8	7/8	R	.0002	8 1/8	DF	33.20	49
50	Studebaker-President 8 6C	8-3 1/16x4 1/4	AC	Al	Ts,C,Tp	13.60	3 3/4	.0170	.0015	.1755	.1400	1	1/16	.017	.125	2	1/16	.015	.135	2 5/8	7/8	R	.0002	8	DF	32.00	50
51	Willys 440	4-3 1/16x4 3/8	A-A	Al	Ts,C,Tp	12.00	3 3/4	.0385	.0030	.170	.160	1	1/16	.010	.096	2	1/32	.010	.135	2 1/16	11/32	R	.0050	9 1/16	Steel	34.00	51

ABBREVIATIONS:

*—Top of skirt, paddle gauge fit
([1])—With bearings and bolts
(a)—Top compression .181; lower .151
(b)—Upper 1/8; lower 1/8
(c)—Upper .175; lower .150
(d)—.0004 press fit one end; .0000 clearance other end
(e)—Upper .162; lower .145
(f)—Top .175; lower .152
(g)—Upper .169; lower .145
(h)—At maximum diameter .0000-.0010
(i)—Upper .150; intermediate .145
(l)—.0025-.00075
(m)—Third .1240; fourth .1865
(n)—No. 1—.1832; No. 2—.1837
(o)—No. 1—.174; No. 2—.1782
(p)—No. 1—.165-.175; No. 2—.140-.150
(r)—No. 1—.165-.175; No. 2—.135-.145
(s)—At maximum diameter .0001-.0011
(t)—Upper .150; intermediate .140
(u)—Top .150; bottom .135
(v)—.187 above pin; .155 below pin
(x)—Upper .015; lower .012
(y)—Upper .155; lower .140
(z)—Upper .172; lower .150
(aa)—.0945 top ring; .0940 center ring

A-A—Aluminum Co. of America and Aluminum Industries
A-B—Aluminum Co. of America and Bohn Aluminum & Brass Corp.
AC—Aluminum Co. of America
Al—Aluminum Industries
Al—Aluminum
Als—Aluminum with steel strut.
An—Anodized finish
At—Auto-thermic
BA—Bohn Aluminum & Brass Corp.
BI—Bohn Aluminum & Brass Corp. and Aluminum Industries
C—Cam ground
CI—Cast Iron
CNI—Chrome Nickel Iron
CS—Cast Steel
DF—Drop forged steel
EI—Electric furnace iron
F—Floating
FP—Finger push at 160°
HMS—High manganese forged steel
O—Oval
P—Locked in piston
PF—Pressed fit
R—Locked in rod
SF—Selective fit
Ss—Split skirt
Tp—Tin plated
TP—Thumb push
Ts—"T"-slot
Us—"U"-slot

SPECIFICATIONS

Connecting Rod and Crankshaft Bearings

Line Numbers	PASSENGER CAR MAKE AND MODEL	CONNECTING ROD BEARINGS								CRANKSHAFT															Line Numbers
		Crankpin Journal	LOWER BEARING											MAIN BEARINGS											
														DIAMETER AND LENGTH (Inches)											
		Diameter and Length (In.)	Material	Make	Average Clearance (In.)	Average End Play (Ins.)	Type of Shim	Type of Bearing	Rods and Pins Removed from	Vibration Damper	Counterweights	End Thrust Taken By	Amount of End Play (In.)	Type	Material	Clearance	Type of Shim	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	
1	Bantam 65	1¼x1	Bab	Own	.0015	.0065	No	Spun	A	No	2	R	.005	SI	BSb	.0020	No	1.997x1.188	2.497x1.005	2.497x1.161							1
2	Buick-Special 40-40	2x1.212	Bab	Own	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	BSb	.0014	So	2⅛x1 17/32	2⅛x1 1/8	2 7/16x1 5/16	2 1/2x1 1/8	2 3/16x1 25/32					2
3	Buick-Super 40-50	2x1.212	Bab	Own	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	BSb	.0014	So	2⅛x1 17/32	2⅛x1 1/8	2 7/16x1 5/16	2 1/2x1 1/8	2 3/16x1 25/32					3
4	Buick-Century 40-60	2¼x1.306	Bab	Own	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	BSb	.0014	So	2⅛x1 3/32	2⅛x1 1/8	2 11/16x1 1/16	2 3/4x1 1/8	2 11/16x2 1/16					4
5	Buick-Roadmaster 40-70	2¼x1.306	Bab	Own	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	BSb	.0014	So	2⅛x1 3/32	2⅛x1 1/8	2 11/16x1 1/16	2 3/4x1 1/8	2 11/16x2 1/16					5
6	Buick-Limited 40-80	2¼x1.306	Bab	Own	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	BSb	.0014	So	2⅛x1 3/32	2⅛x1 1/8	2 11/16x1 1/16	2 3/4x1 1/8	2 11/16x2 1/16					6
7	Buick-Limited 40-90	2¼x1.306	Bab	Own	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	BSb	.0014	So	2⅛x1 17/32	2⅛x1 1/8	2 11/16x1 1/16	2¾x1 1/8	2 11/16x2 1/16					7
8	Cadillac-V8 40-60S	2.46x2 3/32	BSb	FM	.0015	.0045	No	Sep	A	Yes	6	C	.003	SI	BSb	.0015	No	2½x1 1/16	2½x1 3/32	2½x1 3/32							8
9	Cadillac-V8 40-62	2.46x2 3/32	BSb	FM	.0015	.0045	No	Sep	A	Yes	6	C	.003	SI	BSb	.0015	No	2½x1 1/16	2½x1 3/32	2½x1 3/32							9
10	Cadillac-V8 40-72	2.46x2 3/32	BSb	FM	.0015	.0045	No	Sep	A	Yes	6	C	.003	SI	BSb	.0015	No	2½x1 1/16	2½x1 3/32	2½x2 3/32							10
11	Cadillac-V8 40-75	2.46x2 3/32	BSb	FM	.0015	.0045	No	Sep	A	Yes	6	C	.003	SI	BSb	.0015	No	2½x1 1/16	2½x1 3/32	2½x1 3/32							11
12	Cadillac-V16 40-90	2.00x1¾	BSb	FM	.0015	.0060	No	Sep	A	Yes	8	C	.003	SI	(a)	.0015	No	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x2 5/32	12
13	Chevrolet-Master 85	2 3/16x1½	Bab	Own	.0017	.0080	So	Spun	A	Yes	7	RI	.005	SI	BSb	.0030	So	2¼x1 1/16	2 3/16x1 1/16	2¾x1 1/16	2 3/16x1 5/16						13
14	Chevrolet-Spec. DeL. & Mas. DeL.	2 3/16x1½	Bab	Own	.0017	.0080	So	Spun	A	Yes	7	RI	.005	SI	BSb	.0030	So	2¼x1 1/16	2 3/16x1 1/16	2¾x1 1/16	2 3/16x1 5/16						14
15	Chrysler-Windsor & Royal C-25	2 5/16x1 7/32	BSb	.....	.0015	.0085	No	Sep	A	Yes	9	R	.005	SI	BSb	.0015	No	2½x1 1/8	2½x1 1/8	2½x1 1/8	2½x1 7/8						15
16	Chrysler-Saratoga & N. Y. C-26	2 1/8x1 1/8	BSb	.....	.0020	.0085	No	Sep	A	Yes	8	R	.005	SI	BSb	.0015	No	2¼x1 1/16	2¼x1 1/8	2¼x1 1/8	2¼x1 1/8	2 13/16x2 3/32					16
17	Chrysler-Crown Imperial C-27	2 1/8x1 1/8	BSb	.....	.0020	.0085	No	Sep	A	Yes	8	R	.005	SI	BSb	.0015	No	2¼x1 1/16	2¼x1 1/8	2¼x1 1/16	2¼x1 1/8	2¼x2 3/32					17
18	Crosley A	1 3/16x3/8	(c)	Wau	.0025	.0080	No	.....	(d)	No	2	R	.004	SI	BSb	.0020	No	.....	.....	.....	.....	.....	.....	.....	.....	.....	18
19	DeSoto-Custom S-7	2 3/16x1 3/32	BSb	.....	.0015	.0085	No	.....	A	Yes	7	R	.005	.....	BSb	.0015	No	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 7/8						19
20	Dodge D-14-17	2 1/16x1	BSB	.....	.0015	.0085	No	.....	A	Yes	7	R	.005	.....	(b)	.0015	No	2½x1 5/32	2½x1 1/32	2½x1 1/32	2½x1 7/8						20
21	Ford V8-60	1.70x1.41	CSS	FM	.0015	.0100	No	Sep	A	Yes	6	R	.004	SI	SSb	.0015	No	2.10x1.50	2.10x1.50	2.10x2.00							21
22	Ford V8-85	2.00x1.75	CSS	FM	.0015	.0100	No	Sep	A	Yes	6	R	.004	SI	SSb	.0015	No	2.50x1.37	2.00x1.37	2.00x1.965							22
23	Graham-DeL. & Custom 108	2 1/16x1 5/16	CSS	FM	.0015	.0050	No	Sep	A	Yes	9	F	.005	SI	CSS	.0015	No	2⅝x1 7/16	2⅝x1½	2⅝x1½	2⅝x1 27/32						23
24	Graham-Sch. & Cus. Sch. 107	2 1/16x1 5/16	CSS	FM	.0015	.0050	No	Sep	A	Yes	9	F	.005	SI	CSS	.0015	No	2⅝x1 7/16	2⅝x1½	2⅝x1½	2⅝x1 27/32						24
25	Hudson-Six 40	1.937x1.375	SAE13	Own	.0004	.0100	No	Spun	A	Yes	8	C	.009	.....	BB	.0010	Lam	2 13/32x1 5/8	2⅝x1¾	2 13/32x2 5/8							25
26	Hudson-Super & C. C. Six 41-43	1.937x1.375	SAE13	Own	.0004	.0100	No	Spun	A	Yes	8	C	.009	.....	BB	.0010	Lam	2 13/32x1 5/8	2⅝x1¾	2 13/32x2 5/8							26
27	Hudson-Eight & C. C. Eight 44-47	1.937x1.375	SAE13	Own	.0004	.0100	No	Spun	A	Yes	8	C	.009	.....	BB	.0010	Lam	2 13/32x1 5/8	2 7/16x1 3/8	2 13/32x1 7/8	2⅝x1 3/8	2 13/32x2					27
28	La Salle 40-50, 40-52	2.46x2 3/32	BSb	FM	.0015	.0045	No	Sep	A	No	6	C	.003	SI	BSb	.0015	No	2½x1 1/16	2½x1 3/32	2½x1 3/32							28
29	Lincoln V12	2.50x2.00	CL	Own	.0022	.0105	No	Sep	B	Yes	Int	R	.005	.....	CL	.0020	Yes	2⅝x1 5/8	2⅝x1 5/8	2⅝x1 5/8	2⅝x3 1/32						29
30	Lincoln-Zephyr V12	.....	CL	Own	.....	.....	No	Sep	A	Yes	Int	R	.004	SI	SSb	.0020	No	.....	.....	.....	.....	.....	.....	.....	.....	.....	30
31	Mercury V8-95	2.14x1.75	CSS	FM	.0015	.0100	No	Sep	A	Yes	6	R	.004	SI	SSb	.0015	No	2.50x1.37	2.00x1.37	2.00x1.965							31
32	Nash-LaFayette 4010	2.002x1.426	BSb	CG	.0020	.0100	No	Sep	A	Yes	4	C	.004	SI	BSb	.0020	No	2 23/32x1¼	2 23/32x1 5/8	2 23/32x1 5/8	2 23/32x1 7/8	2 23/32x1 5/8	2 23/32x1 5/8				32
33	Nash-Ambassador 6 4020	2.002x1.426	BSb	CG	.0020	.0100	No	Sep	A	Yes	4	C	.004	SI	BSb	.0020	No	2 23/32x1¼	2 23/32x1 5/8	2 23/32x1 5/8	2 23/32x1 7/8	2 23/32x1 5/8	2 23/32x1 5/8				33
34	Nash-Ambassador 8 4080	2.001x1.239	BSb	CG	.0020	.0100	No	Sep	A	Yes	No	C	.004	SI	BSb	.0020	No	2 29/64x1½	2 29/64x1 5/8	2 29/64x1 5/8	2 29/64x1 13/16	2 29/64x1 5/8	2 29/64x1 1/16	2 29/64x1 5/8	2 29/64x1 1/16	2 29/64x2 5/32	34
35	Oldsmobile-Six 60	2 1/16x1 5/8	BSb	Own	.0015	.0157	No	Sep	A	Yes	7	F	.006	.....	BSb	.0017	No	2 29/64x1 13/32	2 29/64x1½	2 29/64x1½	2 29/64x1 13/16						35
36	Oldsmobile-Six 70	2 1/16x1 5/8	BSb	Own	.0015	.0157	No	Sep	A	Yes	7	F	.006	.....	BSb	.0017	No	2 29/64x1 13/32	2 29/64x1½	2 29/64x1½	2 29/64x1 13/16						36
37	Oldsmobile-Custom 8 Cruiser	2 1/16x1 5/8	BSb	Own	.0015	.0080	No	Sep	A	Yes	8	F	.006	.....	BSb	.0020	No	2 23/32x1 3/8	2 23/32x1 1/8	2 23/32x1 1/8	2 23/32x1 1/8	2 23/32x1 1/16					37
38	Packard-One Ten 1800	2 3/32x1¼	BSb	.....	.0010	.0070	No	Sep	A	Yes	6	1	.005	.....	BSb	.0020	No	2¾x	2¾x	2¾x	2¾x						38
39	Packard-One Twenty 1801	2 3/32x1¼	BSb	.....	.0010	.0070	No	Sep	A	Yes	8	C	.005	.....	BSb	.0020	No	2¾x	2¾x	2¾x	2¾x	2¾x					39
40	Packard-Super Eight 1803-4-5	2 1/4x1 5/8	BSb	FM	.0010	.0070	No	Sep	X	Yes	8	C	.005	.....	BSb	.0020	No	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	40
41	Packard-Cus. Sup. Eight 1806-7-8	2 1/4x1 5/8	BSb	FM	.0010	.0070	No	Sep	X	Yes	8	C	.005	.....	BSb	.0020	No	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	2¾x	41
42	Plymouth-Roadking P-9	1 13/16x1	BSb	.....	.0015	.0085	No	.....	A	No	7	R	.005	.....	BSb	.0015	No	2¼x1 11/32	2¼x1 1/32	2¼x1 1/32	2¼x1 7/8						42
43	Plymouth-DeLuxe P-10	1 13/16x1	BSb	.....	.0015	.0085	No	.....	A	No	7	R	.005	.....	BSb	.0015	No	2¼x1 11/32	2¼x1 1/32	2¼x1 1/32	2¼x1 7/8						43
44	Pontiac-Special 6 40-25	2 5/16x1 3/32	BSb	Own	.0011	.0095	No	Sep	A	Yes	9	C	.005	SI	BSb	.0013	No	2½x1¼	2 23/32x1 1/16	2 23/32x1 1/16	2⅝x1 1/8						44
45	Pontiac-DeLuxe 6 40-26	2 5/16x1 3/32	BSb	Own	.0011	.0095	No	Sep	A	Yes	9	C	.005	SI	BSb	.0013	No	2½x1¼	2 23/32x1 1/16	2 23/32x1 1/16	2⅝x1 1/8						45
46	Pontiac-DeLuxe 8 40-28	2x1 1/16	BSb	Own	.0011	.0095	No	Sep	A	Yes	8	C	.005	SI	BSb	.0013	No	2 9/64x1¼	2 23/32x1 1/16	2 13/16x1 1/16	2 13/16x1 7/8	2 13/16x1 7/8					46
47	Pontiac-Torpedo 8 40-29	2x1 1/16	BSb	Own	.0011	.0055	No	Sep	A	Yes	8	C	.005	SI	BSb	.0013	No	2 9/64x1¼	2 23/32x1 1/16	2 13/16x1 1/16	2 13/16x1 7/8	2 13/16x1 7/8					47
48	Studebaker-Champion 6 2G	1 13/32x1 1/16	Bab	Own	.0012	.0070	No	Spun	A	No	4	F	.004	SI	BSb	.0015	No	2 7/16x1 1/16	2 7/16x1 1/16	2 7/16x1 1/16	2 7/16x1 7/8						48
49	Studebaker-Commander 6 10A	2 5/32x1 3/16	Bab	Own	.0012	.0070	No	Spun	A	Yes	5	F	.004	SI	BSb	.0015	No	2½x1 1/16	2½x1 1/16	2½x1 1/16	2½x1 27/32						49
50	Studebaker-President 8 6C	1 7/32x1 1/16	Clev	CG	.0017	.0075	No	Sep	A	Yes	12	F	.004	SI	BSb	.0020	No	2 1/16x1	2 1/16x 29/32	2 1/16x 29/32	2 1/16x 29/32	2 1/16x 29/32	2 1/16x 29/32	2 1/16x 29/32	2 1/16x 29/32	2 1/16x1 1/32	50
51	Willys 440	1 13/16x1 1/16	Bab	Own	.0015	.0070	No	Spun	A	.....	4	F	.005	.....	BSb	.0017	No	2.334x1.92	2.334x1 13/16	2.334x1 3/4	.....	.....	.....	.....	.....	.....	51

ABBREVIATIONS:

(a)—Center bearing bronze back babbitt all others steel backed

(b)—Babbitt steel backed on 4, babbitt backed by bronze and steel on 1, 2 and 3

(c)—Tri-plate nickel and silver

(d)—Above (remove motor)

A—Above

Bab—Babbitt

Bb—Bronze backed babbitt

BSb—Babbitt, Steel backed

BSB—Babbitt backed by bronze and steel

C—Center bearing

CG—Cleveland Graphite Bronze Co.

CL—Copper-Lead, Steel backed

Clev—Clevite No. 1535

CSS—Cadmium - Silver - Copper lined, Steel backed

F—Front Bearing

FM—Federal-Mogul Corporation

Int—Integral

Lam—Laminated

No—No or None

R—Rear Bearing

RI—Rear Intermediate

Sep—Separate

SI—Slip-in type

So—Solid

SSb—Special Alloy, Steel backed

Wau—Waukesha

X—Pistons above Rods below.

Valves—Intake and Exhaust

Line Numbers	PASSENGER CAR MAKE AND MODEL	INTAKE VALVE															EXHAUST VALVE													Line Numbers
		Make	Overall Length (In.)	Head		Seat			Stem Diameter (In.)	Stem to Guide Clearance (In.)—Average	Lift (In.)	Springs					Make	Overall Length	Head		Seat			Stem Diameter (In.)	Stem to Guide Clearance (In.)—Average	Lift (In.)	Springs					
				Material	Overall Diameter (In.)	Angle (Deg.)	Insert	Material				Pressure (Lb.)		Length (In.)					Material	Overall Diameter	Angle (Deg.)	Insert	Material				Pressure (Lb.)		Length (In.)			
												Valve Closed	Valve Open	Valve Closed	Valve Open	Out of Engine											Valve Closed	Valve Open	Valve Closed	Valve Open	Out of Engine	
1	Bantam 65	WR	3.250	3140	1.125	45	N	.....	.279	.0022	.257	28	44	1.250	1.000	1.687	WR	3.250	Sil	1.031	45	N	.....	.279	.0022	.257	28	44	1.250	1.000	1.687	1
2	Buick-Special 40-40	TP	5.100	1050	1.531	45	N	.....	.372	.0025	.348	29†	70†	1.937†	1.593†	2.312†	TP	5.100	Sil-B	1.343	45	N	.....	.371	.0030	.348	29†	70†	1.937†	1.593†	2.312†	2
3	Buick-Super 40-50	TP	5.100	1050	1.531	45	N	.....	.372	.0025	.348	29†	70†	1.937†	1.593†	2.312†	TP	5.100	Sil-B	1.343	45	N	.....	.371	.0030	.348	29†	70†	1.937†	1.593†	2.312†	3
4	Buick-Century 40-60	TP	5.250	1050	1.781	45	N	.....	.372	.0025	.347	29†	70†	1.937†	1.593†	2.312†	TP	5.250	Sil-B	1.437	45	N	.....	.371	.0030	.342	29†	70†	1.937†	1.593†	2.312†	4
5	Buick-Roadmaster 40-70	TP	5.250	1050	1.781	45	N	.....	.372	.0025	.347	29†	70†	1.937†	1.593†	2.312†	TP	5.250	Sil-B	1.437	45	N	.....	.371	.0030	.342	29†	70†	1.937†	1.593†	2.312†	5
6	Buick-Limited 40-80	TP	5.250	1050	1.781	45	N	.....	.372	.0025	.347	29†	70†	1.937†	1.593†	2.312†	TP	5.250	Sil-B	1.437	45	N	.....	.371	.0030	.342	29†	70†	1.937†	1.593†	2.312†	6
7	Buick-Limited 40-90	TP	5.250	1050	1.781	45	N	.....	.372	.0025	.347	29†	70†	1.937†	1.593†	2.312†	TP	5.250	Sil-B	1.437	45	N	.....	.371	.0030	.342	29†	70†	1.937†	1.593†	2.312†	7
8	Cadillac-V8 40-60S	Var	.....	3140	1.881	45	.....	.....	.342	.0023	.335	66	145	1.926	1.581	2.210	WR	.....	82120	1.631	45	N	.....	.341	.0033	.345	66	145	1.926	1.581	2.210	8
9	Cadillac-V8 40-62	Var	.....	3140	1.881	45	.....	.....	.342	.0023	.335	66	145	1.926	1.581	2.210	WR	.....	82120	1.631	45	N	.....	.341	.0033	.345	66	145	1.926	1.581	2.210	9
10	Cadillac-V8 40-72	Var	.....	3140	1.881	45	.....	.....	.342	.0023	.335	66	145	1.926	1.581	2.210	WR	.....	82120	1.631	45	N	.....	.341	.0033	.345	66	145	1.926	1.581	2.210	10
11	Cadillac-V8 40-75	Var	.....	3140	1.881	45	.....	.....	.342	.0023	.335	66	145	1.926	1.581	2.210	WR	.....	82120	1.631	45	N	.....	.341	.0033	.345	66	145	1.926	1.581	2.210	11
12	Cadillac-V16 40-90	WR	5.531	3140	1.500	45	.....	.....	.342	.0020	.290	50	98	1.772	1.482	2.074	WR	5.546	Sil-X	1.375	45	N	.....	.341	.0030	.302	50	100	1.772	1.470	2.074	12
13	Chevrolet-Master 85	Own	6.078	ES	1.640	30	N	.....	.341	.0020	.295	52	127	1.812	1.500	2.218	Own	4.812	.....	1.468	30	N	.....	.340	.0030	.312	52	127	1.812	1.500	2.218	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	Own	6.078	ES	1.640	30	N	.....	.341	.0020	.295	52	127	1.812	1.500	2.218	Own	4.812	.....	1.468	30	N	.....	.340	.0030	.312	52	127	1.812	1.500	2.218	14
15	Chrysler-Windsor & Royal C-25	Al	4.781	3140	1.656	45	.....	.....	.340	.0025	.375	42	111	1.750	1.375	2.000	TP	4.781	Sil-B	1.531	45	Y	SA	.340	.0025	.375	42	111	1.750	1.375	2.000	15
16	Chrysler-Saratoga & N. Y. C-26	Al	5.875	3140	1.531	45	.....	.....	.340	.0025	.375	55	133	2.031	1.656	2.390	TP	5.875	Sil-B	1.343	45	Y	SA	.340	.0025	.375	55	133	2.031	1.656	2.390	16
17	Chrysler-Crown Imperial C-27	Al	5.875	3140	1.531	45	.....	.....	.340	.0025	.375	55	133	2.031	1.656	2.390	TP	5.875	Sil-B	1.343	45	Y	SA	.340	.0025	.375	55	133	2.031	1.656	2.390	17
18	Crosley A	Al	5.703	3140	1.375	45	N	.....	.312	.0025	.300	20	41	1.500	1.234	1.843	Al	5.734	Dia-9	1.156	45	N	.....	.312	.0035	.300	20	41	1.500	1.234	1.843	18
19	DeSoto-Custom S-7	Al	4.781	AS	1.656	45	.....	.....	.340	.0025	.375	42	111	1.750	1.375	2.000	TP	4.781	Sil-B	1.531	45	Y	SA	.340	.0025	.375	42	111	1.750	1.375	2.000	19
20	Dodge D-14-17		4.781	AS	1.468	45	.....	.....	.340	.0020	.312	36	80	1.750	1.437	2.093	TP	4.781	Sil-B	1.468	45	Y	SA	.340	.0040	.312	36	80	1.750	1.437	2.093	20
21	Ford V8-60	Own	.....	CN	1.281	45	Y	CT	.279	.0025	.251	28	50	2.050	.....	.....	Own	.....	CNS	1.281	45	Y	.....	.279	.0025	.251	28	50	2.050	.....	.....	21
22	Ford V8-85	Own	.....	CN	1.537	45	Y	CT	.311	.0025	.292	38½	78	2.130	.....	.....	Own	.....	CNS	1.537	45	Y	.....	.311	.0025	.292	38½	78	2.130	.....	.....	22
23	Graham-DeL. & Custom 108	TP	4.953	CN	1.515	30	N	.....	.341	.0025	.312	44	98	1.656	1.343	2.000	TP	4.953	Sil-XB	1.328	45	N	.....	.341	.0025	.312	44	98	1.656	1.343	2.000	23
24	Graham-Sch. & Cus. Sch. 107	TP	4.953	CN	1.515	30	N	.....	.341	.0025	.312	44	98	1.656	1.343	2.000	TP	4.953	Sil-XB	1.328	45	N	.....	.341	.0025	.312	44	98	1.656	1.343	2.000	24
25	Hudson-Six 40	WR	5.344	3140	1.375	45	N	.....	.341	.0022	.343	40	80	.....	.....	2.343	WR	5.344	Sil-X	1.375	45	N	.....	.339	.0040	.343	40	80	.....	.....	2.343	25
26	Hudson-Super & C. C. Six 41-43	WR	5.344	3140	1.375	45	N	.....	.341	.0022	.343	40	80	.....	.....	2.343	WR	5.344	Sil-X	1.375	45	N	.....	.339	.0040	.343	40	80	.....	.....	2.343	26
27	Hudson-Eight & C. C. Eight 44-47	WR	5.094	3140	1.500	45	N	.....	.343	.0022	.343	40	80	.....	.....	2.343	WR	5.094	Sil-X	1.375	45	N	.....	.339	.0040	.343	40	80	.....	.....	2.343	27
28	La Salle 40-50, 40-52	Var	.....	3140	1.881	45	.....	.....	.342	.0023	.335	66	145	1.926	1.581	2.210	.....	.....	82120	1.631	45	N	.....	.341	.0033	.345	66	145	1.926	1.581	2.210	28
29	Lincoln V12	WR	6.750	CN	1.687	45	.....	.....	.312	.0035	.343	57	135	2.687	2.343	.....	WR	6.750	Sil-X	1.687	45	Y	.....	.312	.0035	.343	57	135	2.687	2.343	.....	29
30	Lincoln-Zephyr V12	Own	.....	CN	.....	45	Y	CT	.311	.0025	.292	54	116	.....	.....	.....	Own	.....	.....	1.537	45	Y	.....	.311	.0025	.292	54	116	.....	.....	.....	30
31	Mercury V8-95	Own	.....	CN	1.537	45	Y	CT	.311	.0025	.292	38½	78	2.130	.....	.....	Own	.....	CNS	1.537	45	Y	.....	.311	.0025	.292	38½	78	2.130	.....	.....	31
32	Nash-LaFayette 4010	Al	5.859	CN	1.656	45	N	.....	.341	.0030	.312	70	115	2.000	1.687	2.500	WR	5.859	.....	1.531	45	N	.....	.341	.0030	.312	70	115	2.000	1.687	2.500	32
33	Nash-Ambassador 6 4020	WR	5.531	CN	1.750	45	N	.....	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000*	WR	5.531	Sil-X	1.593	45	N	.....	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000*	33
34	Nash-Ambassador 8 4080	WR	5.500	CN	1.656	45	N	.....	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000*	WR	5.500	Sil-X	1.468	45	N	.....	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000*	34
35	Oldsmobile-Six 60	TP	5.796	3140	1.562	30	N	.....	.343	.0027	.300	50½	95½	2.250	1.937	2.593	TP	5.796	Sil-XCR	1.421	45	N	.....	.343	.0032	.300	50½	95½	2.250	1.937	2.593	35
36	Oldsmobile-Six 70	TP	5.796	3140	1.562	30	N	.....	.343	.0027	.300	50½	95½	2.250	1.937	2.593	TP	5.796	Sil-XCR	1.421	45	N	.....	.343	.0032	.300	50½	95½	2.250	1.937	2.593	36
37	Oldsmobile-Custom 8 Cruiser	TP	5.796	3140	1.562	30	N	.....	.343	.0027	.300	46	94	2.281	1.968	2.625	TP	5.796	Sil-XCR	1.421	45	N	.....	.343	.0033	.300	46	94	2.281	1.968	2.625	37
38	Packard-One Ten 1800	WR	5.515	CN	1.531	30	.....	.....	.340	.0020	.318	50	120	1.625	.....	.....	WR	5.515	Sil-X	1.375	45	.....	.....	.340	.0040	.317	50	120	1.625	.....	.....	38
39	Packard-One Twenty 1801	WR	5.515	CN	1.484	30	.....	.....	.340	.0020	.318	50	120	1.625	.....	.....	WR	5.515	Sil-X	1.375	45	.....	.....	.340	.0040	.317	50	120	1.625	.....	.....	39
40	Packard-Super Eight 1803-4-5	WR	5.093	CN	1.670	30	.....	.....	.340	.0020	.340	58	135	1.750	.....	.....	WR	5.093	Sil-X	1.437	45	.....	.....	.340	.0040	.340	58	135	1.750	.....	.....	40
41	Packard-Cus. Sup. Eight 1806-7-8	WR	5.093	CN	1.670	30	.....	.....	.340	.0020	.340	58	135	1.750	.....	.....	WR	5.093	Sil-X	1.437	45	.....	.....	.340	.0040	.340	58	135	1.750	.....	.....	41
42	Plymouth-Roadking P-9	TP	4.781	AS	1.468	45	.....	.....	.340	.0020	.312	36	80	1.750	1.437	2.093	TP	4.781	Sil-B	1.468	45	Y	SA	.340	.0040	.312	36	80	1.750	1.437	2.093	42
43	Plymouth-DeLuxe P-10	TP	4.781	AS	1.468	45	.....	.....	.340	.0020	.312	36	80	1.750	1.437	2.093	TP	4.781	Sil-B	1.468	45	Y	SA	.340	.0040	.312	36	80	1.750	1.437	2.093	43
44	Pontiac-Special 6 40-25	Own	5.718	SC	1.593	30	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	Own	5.718	CNS	1.468	45	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	44
45	Pontiac-DeLuxe 6 40-26	Own	5.718	SC	1.593	30	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	Own	5.718	CNS	1.468	45	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	45
46	Pontiac-DeLuxe 8 40-28	Own	5.531	SC	1.468	30	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	Own	5.531	CNS	1.343	45	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	46
47	Pontiac-Torpedo 8 40-29	Own	5.531	SC	1.468	30	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	Own	5.531	CNS	1.343	45	N	.....	.312	.0030	.296	60	101	1.906	1.593	.....	47
48	Studebaker-Champion 6 2G	Al	4.343	CN	1.343	45	N	.....	.312	.0020	.312	51	92	1.656	1.343	2.093	.....	4.343	Dia-9	1.281	45	N	.....	.312	.0020	.312	51	92	1.656	1.343	2.093	48
49	Studebaker-Commander 6 10A	.....	5.218	CN	1.468	45	N	.....	.343	.0020	.343	57	130	2.093	1.750	.....	.....	5.218	Sil-1	1.281	45	N	.....	.343	.0020	.343	57	130	2.093	1.750	.....	49
50	Studebaker-President 8 6C	.....	5.218	CN	1.406	45	N	.....	.343	.0020	.343	57	130	2.093	1.750	.....	.....	5.218	Sil-1	1.281	45	N	.....	.343	.0020	.343	57	130	2.093	1.750	.....	50
51	Willys 440	Al	5.750	3140	1.531	45	N	.....	.373	.0023	.359	59	100	2.165	1.814	2.684	Al	5.750	Dia-9	1.468	45	N	.....	.372	.0028	.359	59	100	2.165	1.814	2.684	51

ABBREVIATIONS:

†—Outer only:
Inner—18 lbs., 1 3/32 inches, Valve Closed
48 lbs., 1 3/32 inches, Valve Open
Out of Engine, 1 7/8 inches

*—Outer only:
Inner—21 lbs., 1 5/16 inches, Valve Closed
51 lbs., 1 1/32 inches, Valve Open
Out of Engine, 1 3/32 inches

Al—Aluminum Industries, Inc.

AS—Alloy Steel
CN—Chrome Nickel Steel
CNS—Chrome Nickel Silicon
CT—Chrome Tungsten Steel
Dia—Diachrome

ES—Extruded Stee
N—No or None
SA—Special Alloy
SC—Silicon Chromium
Sil—Silchrome

TP—Thompson Products, Inc.
Var—Various
WR—Wilcox Rich Division
Y—Yes

SPECIFICATIONS

Timing Gears, Valve Timing and Lubrication

Line Numbers	PASSENGER CAR MAKE AND MODEL	CRANKSHAFT GEAR OR SPROCKET: Make	CRANKSHAFT GEAR OR SPROCKET: Material	CAMSHAFT GEAR OR SPROCKET: Make	CAMSHAFT GEAR OR SPROCKET: Material	TIMING CHAIN: Make	TIMING CHAIN: Number of Links	TIMING CHAIN: Width (In.)	TIMING CHAIN: Pitch	TIMING CHAIN: Adjustment	VALVE TAPPET CLEARANCE (Inches): Intake: Operating	VALVE TAPPET CLEARANCE (Inches): Intake: Timing	VALVE TAPPET CLEARANCE (Inches): Exhaust: Operating	VALVE TAPPET CLEARANCE (Inches): Exhaust: Timing	Hydraulic Valve Lifters	VALVE TIMING (Degrees): Intake: Open	VALVE TIMING (Degrees): Intake: Closed	VALVE TIMING (Degrees): Exhaust: Open	VALVE TIMING (Degrees): Exhaust: Closed	Type Lubrication	ENGINE: Oil Pressure to: Main Bearings	ENGINE: Oil Pressure to: Connecting Rods	ENGINE: Oil Pressure to: Wristpins	ENGINE: Oil Pressure to: Camshaft Bearings	ENGINE: Timing Gear or Chain	ENGINE: Oil Pump Type	ENGINE: OIL GRADE S.A.E. No.: Summer	ENGINE: OIL GRADE S.A.E. No.: Winter	ENGINE: Normal Oil Pressure Lbs. at M.P.H.	ENGINE: Relief Valve Opens—Lbs. Pressure	ENGINE: Crankcase Capacity—Dry—(Qts.)	ENGINE: Oil Pressure Gage Make	ENGINE: External Oil Filter Make	Line Numbers
1	Bantam....65	Own	CI	Own	CI	No	No	No	No	No	.011H	.011	.012H	.011	N	19BT	50AB	57BB	12AT	P	Y	Y	N	Y	Po	Ge	30	20	30-50		3	SW	No	1
2	Buick-Special....40-40	Own	Steel	Own	CI	LB	49	1	½	No	.015H	.....	.015H	.....	N	13BT	68AB	55BB	22AT	P	Y	Y	N	Y	Po	Ge	20	10W	45-35	45	8	AC	AC	2
3	Buick-Super....40-50	Own	1112	Own	CI	LB	49	1	½	No	.015H	.....	.015H	.....	N	13BT	68AB	55BB	22AT	P	Y	Y	N	Y	Po	Ge	20	10W	45-35	45	8	AC	AC	3
4	Buick-Century....40-60	Own	1112	Own	CI	LB	50	1	½	No	.015H	.....	.015H	.....	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Po	Ge	20	10W	45-35	45	10	AC	AC	4
5	Buick-Roadmaster....40-70	Own	1112	Own	CI	LB	50	1	½	No	.015H	.....	.015H	.....	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Po	Ge	20	10W	45-35	45	10	AC	AC	5
6	Buick-Limited....40-80	Own	1112	Own	CI	LB	50	1	½	No	.015H	.....	.015H	.....	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Po	Ge	20	10W	45-35	45	10	AC	AC	6
7	Buick-Limited....40-90	Own	1112	Own	CI	LB	50	1	½	No	.015H	.....	.015H	.....	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Po	Ge	20	10W	45-35	45	10	AC	AC	7
8	Cadillac-V8....40-60S	Own	1120	Own	CI	Mor	62	1¼	⅜	No	AA	AA	AA	AA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Po	Ge	20	10W	25-30	30	7	AC	No	8
9	Cadillac-V8....40-62	Own	1120	Own	CI	Mor	62	1¼	⅜	No	AA	AA	AA	AA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Po	Ge	20	10W	25-30	30	7	AC	No	9
10	Cadillac-V8....40-72	Own	1120	Own	CI	Mor	62	1¼	⅜	No	AA	AA	AA	AA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Po	Ge	20	10W	25-30	30	7	AC	No	10
11	Cadillac-V8....40-75	Own	1120	Own	CI	Mor	62	1¼	⅜	No	AA	AA	AA	AA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Po	Ge	20	10W	25-30	30	7	AC	No	11
12	Cadillac-V16....40-90	Own	1120	Own	CI	Mor	56	1¼	⅜	No	AA	AA	AA	AA	Y	6BT	28AB	44BB	12AT	P	Y	Y	N	Y	Po	Ge	20	10W	25-30	30	11	AC	AC	12
13	Chevrolet-Master....85	Own	Steel	GC	.....	GC	No	No	No	No	.006H	.006	.013H	.013	N	3BT	35AB	46BB	5AT	P	Y	Y	N	Y	Po	Ge	20	20W	15-43	75	5	AC	No	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	Own	Steel	GC	.....	GC	No	No	No	No	.006H	.006	.013H	.013	N	3BT	35AB	46BB	5AT	P	Y	Y	N	Y	Po	Ge	20	20W	15-40	75	5	AC	No	14
15	Chrysler-Windsor & Royal....C-25	Mor	Steel	Mor	CI	Mor	48	1	½	No	.008H	.014	.010H	.014	N	12BT	44AB	50BB	6AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	5	.....	Pur	15
16	Chrysler-Saratoga & N. Y....C-26	Whit	Steel	Whit	SS	Whit	47	1¼	½	No	.008H	.011	.010H	.014	N	6BT	50AB	44BB	12AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	6	.....	Pur	16
17	Chrysler-Crown Imperial....C-27	Whit	Steel	Whit	CI	Whit	47	1¼	½	No	.008H	.011	.010H	.014	N	6BT	50AB	44BB	12AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	6	.....	Pur	17
18	Crosley....A	Wau	1340	For	Fiber	No	No	No	No	No	.008C	.006	.007C	.006	N	20BT	60AB	60BB	20AT	P	Y	Y	N	Y	Po	Va	40	30	40-30	40	2	AC	No	18
19	DeSoto-Custom....S-7	Mor	Steel	Mor	CI	Mor	48	1	½	No	.008H	.014	.010H	.014	N	12BT	44AB	50BB	6AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	5	.....	Pur	19
20	Dodge....D-14-17	Mor	Steel	Mor	CI	Mor	48	1	½	No	.008H	.011	.008H	.012	N	6AT	46AB	42BB	8AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	5	.....	Pur	20
21	Ford....V8-60	.....	Steel	CD	Cel	No	No	No	No	No	.013C	.013	.013C	.013	N	9½BT	54½AB	57½BB	6½AT	P	Y	Y	N	Y	Pe	Ge	30	20W	30-	30	4	KS	.....	21
22	Ford....V8-85	.....	Steel	CD	Cel	No	No	No	No	No	.013C	.013	.013C	.013	N	TC	44AB	48BB	6AT	P	Y	Y	N	Y	Po	Ge	30	20W	30-	30	5	KS	.....	22
23	Graham-DeL. & Custom....108	LB	Steel	LB	SS	LB	46	1	½	No	.010H	.010	.010H	.012	N	8½BT	54½AB	41BB	11AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	50	5	KS	No	23
24	Graham-Sch. & Cus. Sch....107	LB	Steel	LB	SS	LB	46	1	½	No	.010H	.010	.010H	.012	N	8½BT	54½AB	41BB	11AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	50	5	KS	No	24
25	Hudson-Six....40	Own	CI	GE	Tex	No	No	No	No	No	.006H	.....	.008H	.....	N	10⅜BT	60AB	50BB	18⅜AT	SP	N	N	N	N	SP	OP	20	10W	3-	3	6	Own	.....	25
26	Hudson-Super & C. C. Six..41-43	Own	CI	GE	Tex	No	No	No	No	No	.006H	.....	.008H	.....	N	10⅜BT	60AB	50BB	18⅜AT	SP	N	N	N	N	SP	OP	20	10W	3-	3	6	Own	.....	26
27	Hudson-Eight & C. C. Eight 44-47	Own	CI	GE	Tex	No	No	No	No	No	.006H	.....	.008H	.....	N	10⅜BT	60AB	50BB	18⅜AT	SP	N	N	N	N	SP	OP	20	10W	3-	3	9	Own	.....	27
28	La Salle....40-50, 40-52	Own	1120	Own	CI	Mor	62	1¼	⅜	No	AA	AA	AA	AA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Po	Ge	20	10W	25-30	30	7	AC	No	28
29	Lincoln....V12	Own	Steel	Own	.....	Mor	104	1½	⅜	No	AA	AA	AA	AA	Y	21BT	.....	.....	.....	P	Y	Y	N	Y	Po	Ge	30	20W	40-50	40	12	KS	Pur	29
30	Lincoln-Zephyr....V12	Own	Steel	CD	Al	No	No	No	No	No	AA	AA	AA	AA	Y	.....	.....	.....	.....	P	Y	Y	N	Y	Po	Ge	30	20W	30-50	50	5	KS	Fram	30
31	Mercury....V8-95	Own	Steel	CD	Cel	No	No	No	No	No	.013C	.013	.013C	.013	N	TC	44AB	48BB	6AT	P	Y	Y	N	Y	Po	Ge	30	20W	30-	30	5	KS	.....	31
32	Nash-LaFayette....4010	Own	Steel	Own	CI	W-D	60	1/16	⅜	No	.015	.015	.015	.015	N	21½BT	71AB	71BB	36½AT	P	Y	Y	Y	Y	Po	Ge	20	10W	30-20	30	6	KS	No	32
33	Nash-Ambassador 6....4020	Own	Steel	Own	CI	W-D	60	1/16	⅜	No	.015	.015	.015	.015	N	24½BT	70½AB	49½BB	5AT	P	Y	Y	Y	Y	Po	Ge	20	10W	30-20	30	6	KS	BS	33
34	Nash-Ambassador 8....4080	Own	Steel	Own	CI	D	62	1/16	⅜	No	.015	.015	.015	.015	N	20BT	74AB	45BB	10AT	P	Y	Y	Y	Y	Po	Ge	20	10W	30-20	30	7	KS	BS	34
35	Oldsmobile-Six....60	Whit	Steel	Whit	SS	Whit	47	1	½	No	.008H	.012	.011H	.015	N	5BT	45AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	.....	.....	32-	27	5	AC	†	35
36	Oldsmobile-Six....70	Whit	Steel	Whit	SS	Whit	47	1	½	No	.008H	.012	.011H	.015	N	5BT	45AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	.....	.....	32-	27	5	AC	†	36
37	Oldsmobile-Custom 8 Cruiser....	LB	Steel	LB	SS	LB	47	1	½	No	.008H	.012	.011H	.015	N	.....	35AB	45BB	10AT	P	Y	Y	Y	Y	Po	Ge	.....	.....	32-	27	6	AC	†	37
38	Packard-One Ten....1800	Own	Steel	Own	CI	MR	58	1¼	⅜	No	.007H	.012	.010H	.015	N	1BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	30	10W	45-	.....	5	.....	No	38
39	Packard-One Twenty....1801	Own	Steel	Own	CI	MR	58	1¼	⅜	No	.007H	.012	.010H	.015	N	1BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	30	10W	45-	.....	6	.....	No	39
40	Packard-Super Eight 1803-4-5	Own	Steel	Own	CI	MR	62	1¼	⅜	No	AA	AA	AA	.015	Y	4BT	51AB	49BB	10AT	P	Y	Y	Y	Y	Po	Ge	30	10W	50-	.....	8	.....	Pur	40
41	Packard-Cus. Sup. Eight.1806-7-8	Own	Steel	Own	CI	MR	62	1¼	⅜	No	AA	AA	AA	.015	Y	4BT	51AB	49BB	10AT	P	Y	Y	Y	Y	Po	Ge	30	10W	50-	.....	8	.....	Pur	41
42	Plymouth-Roadking....P-9	Mor	Steel	Mor	CI	Mor	48	1	½	No	.006H	.011	.008H	.012	N	6AT	46AB	42BB	8AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	5	.....	Pur	42
43	Plymouth-DeLuxe....P-10	Mor	Steel	Mor	CI	Mor	48	1	½	No	.006H	.011	.008H	.012	N	6AT	46AB	42BB	8AT	P	Y	Y	N	Y	Po	Ge	30	20W	45-30	42	5	.....	Pur	43
44	Pontiac-Special 6....40-25	Own	Steel	Own	CN	Mor	56	1	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	20	10W	35-42	40	6	AC	†	44
45	Pontiac-DeLuxe 6....40-26	Own	Steel	Own	CN	Mor	56	1	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	20	10W	35-42	40	6	AC	†	45
46	Pontiac-DeLuxe 8....40-28	Own	Steel	Own	CN	Mor	56	⅞	⅜	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	20	10W	35-42	40	6	AC	†	46
47	Pontiac-Torpedo 8....40-29	Own	Steel	Own	CN	Mor	56	⅞	⅜	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Po	Ge	20	10W	35-42	40	6	AC	†	47
48	Studebaker-Champion 6....2G	Own	CI	CD	Cel	No	No	No	No	No	.016C	.020	.016C	.020	N	15BT	49AB	54BB	10AT	P	Y	Y	N	Y	Po	Ge	30	20	40-30	40	5	MM	No	48
49	Studebaker-Commander 6....10A	Own	CI	CD	Cel	No	No	No	No	No	.016C	.020	.016C	.020	N	15BT	49AB	54BB	10AT	P	Y	Y	N	Y	Po	Ge	30	20	40-30	40	6	SW	Fram	49
50	Studebaker-President 8....6C	Own	CI	CD	Cel	No	No	No	No	No	.016C	.020	.016C	.020	N	15BT	49AB	54BB	10AT	P	Y	Y	N	Y	Po	Ge	30	20	60-30	60	8	SW	Fram	50
51	Willys....440	LB	Steel	LB	CI	LB	47	1¼	½	No	.014	.020	.014	.020	N	9BT	50AB	47BB	12AT	P	Y	Y	N	Y	Po	Ge	20	10W	75-30	75	4	KS	No	51

ABBREVIATIONS:

†—At extra cost
AA—Automatic adjustment
AB—After bottom center
Al—Aluminum
AT—After top center
BB—Before bottom center
BS—Briggs & Stratton
BT—Before top center
C—Cold
CD—Continental Diamond Fibre Co.
Cel—Celeron with steel hub
CI—Cast iron
CN—Chrome nickel iron
D—Diamond Chain & Mfg. Co.
F—Formica Co.
GC—General Electric and Continental Diamond Fibre Co.
Ge—Gear
GE—General Electric Co.
H—Hot
KS—King-Seeley Corp.
LB—Link-Belt Company
MM—Motor Meter
Mor—Morse Chain Co.
MR—Morse Chain Co. and Ramsey Chain Co.
N—No or None
OP—Oscillating plunger
P—Pressure
Po—Positive
Pur—Purolator (Motor Improvements, Inc.)
SP—Splash
SS—Semi-steel
SW—Stewart-Warner
TC—Top center
Tex—Textolite
Va—Vane
Wau—Waukesha
W-D—Whitney Mfg. Co. and Diamond Chain & Mfg. Co.
Whit—Whitney Chain & Mfg. Co.
Y—Yes

Fuel and Cooling Systems

Line Numbers	PASSENGER CAR MAKE AND MODEL	Gasoline Tank Capacity (Gal.)	FUEL FEED		CARBURETOR				Manifold Heat Control	Automatic Choke—Make	Air Cleaner—Make	Muffler—Make	WATER PUMP		Thermostat—Make	By-pass for Recirculation	RADIATOR CORE		Cooling System Capacity (Qts.)	Full-length Water Jackets	LOWER HOSE		UPPER HOSE		FAN BELT					Make of Fan	Line Numbers
			Type	Make	Make	Model	Size	Type					Type	Drive			Type	Make			Inside Diameter (In.)	Length (In.)	Inside Diameter (In.)	Length (In.)	Number Used	Make	Angle of Vee (Deg.)	Length—Outside (In.)	Width—Maximum (In.)		
1	Bantam.....65	5	Gr	.....	Zen	61A5	33/32	SU	No	No	AC	McK	No	No	No	No	FF	Jam	5½	No	1¼	9⅜	1¼	6⅛	1	Gr	42	29⅜	5/8	SC	1
2	Buick-Special.....40-40	17	CP	AC	Str	AAV-16	1	DD	Aut	Str	AC	Hay	Ce	FB	Har	Yes	Cel	Har	13¼	No	1 1/16	ET	1 1/16	ET	1	Var	.....	.....	.....	Hay	2
3	Buick-Super.....40-50	17	CP	AC	Str	AAV-16	1	DD	Aut	Str	AC	Hay	Ce	FB	Har	Yes	Cel	Har	13¼	No	1 1/16	ET	1 1/16	ET	1	Var	.....	.....	.....	Hay	3
4	Buick-Century.....40-60	17	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Hay	Ce	FB	Har	Yes	Cel	Har	17	No	1 1/16	ET	1 1/16	ET	1	Var	.....	.....	.....	Hay	4
5	Buick-Roadmaster.....40-70	17	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Hay	Ce	FB	Har	Yes	Cel	Har	17	No	1 1/16	ET	1 1/16	ET	1	Var	.....	.....	.....	Hay	5
6	Buick-Limited.....40-80	19	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Hay	Ce	FB	Har	Yes	Cel	Har	17	No	1 1/16	ET	1 1/16	ET	1	Var	.....	.....	.....	Hay	6
7	Buick-Limited.....40-90	19	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Hay	Ce	FB	Har	Yes	Cel	Har	17	No	1 1/16	ET	1 1/16	ET	1	Var	.....	.....	.....	Hay	7
8	Cadillac-V8.....40-60S	22	CP	AC	Str	AAV-26	1¼	DD	No	Str	AC	Wal	Ce	FB	No	No	TF	Har	24½	Yes	2	MH	1¼	(a)	1	Var	34	39 1/16*	1 1/4	Hay	8
9	Cadillac-V8.....40-62	22	CP	AC	Str	AAV-26	1¼	DD	No	Str	AC	Wal	Ce	FB	No	No	TF	Har	24½	Yes	2	MH	1¼	(a)	1	Var	34	33 11/16*	1 1/4	Hay	9
10	Cadillac-V8.....40-72	26	CP	AC	Str	AAV-26	1¼	DD	No	Str	AC	Wal	Ce	FB	No	No	TF	Har	24½	Yes	2	MH	1¼	(a)	1	Var	34	33 11/16*	1 1/4	Hay	10
11	Cadillac-V8.....40-75	26½	CP	AC	Str	AAV-26	1¼	DD	No	Str	AC	Wal	Ce	FB	No	No	TF	Har	24½	Yes	2	7⅛	1¼	11¼	1	Var	34	39 1/16*	1 1/4	Hay	11
12	Cadillac-V16.....40-90	26½	2P	AC	Car	(b)	1 1/16	DD	No	Car	AC	Wal	2-Ce	FB	No	No	Cel	Har	30	Yes	1¾	2-MH	1½	2-10¼	2	Ga	34	49⅝*	5/8	Hay	12
13	Chevrolet-Master.....85	16	CP	AC	Car	W1-420-S	1¼	SD	Aut	No	AC	Var	Ce	FB	Har	No	Cel	Har	14	Yes	1½	7¾	1¼	5⅝	1	Var	32	42 1/16	1/16	Own	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	16	CP	AC	Car	W1-420-S	1¼	SD	Aut	No	AC	Var	Ce	FB	Har	No	Cel	Har	14	Yes	1½	7¾	1¼	5⅝	1	Var	32	42 1/16	1/16	Own	14
15	Chrysler-Windsor & Royal...C-25	17	CP	AC	Car	BB-E6S1	1½	DD	Aut	Car	AC	.....	Ce	FB	.....	Yes	Cel	Jam	18	Yes	1¾	8	1½	9¼	1	.....	40	48 1/16*	3/4	.....	15
16	Chrysler-Saratoga & N. Y....C-26	20	CP	AC	Str	AAV-2	1¼	DD	Aut	Str	AC	.....	Ce	FB	.....	Yes	TF	.....	24	Yes	1¾	5¾	1¾	9½	1	.....	40	50 5/8	3/4	.....	16
17	Chrysler-Crown Imperial....C-27	20	CP	AC	Str	AAV-2	1¼	DD	Aut	Str	AC	.....	Ce	FB	.....	Yes	TF	.....	24	Yes	1¾	5¾	1¾	9½	1	.....	40	50 5/8	3/4	.....	17
18	Crosley.....A	4¼	Gr	.....	Til	DY-1A	1	SD	No	No	AC	Rex	(c)	(c)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18
19	DeSoto-Custom.....S-7	17	CP	AC	Car	BB-E6N1	1½	DD	Aut	Car	AC	.....	Ce	FB	.....	Yes	Cel	Jam	17	Yes	1¾	8	1½	9¼	1	.....	40	48 1/16	3/4	.....	19
20	Dodge.....D-14-17	17	CP	AC	Str	BXV-3	1⅜	SD	Aut	Str	Yes	.....	Ce	FB	.....	Yes	Cel	Fed	15	Yes	1¾	8	1½	9¼	1	.....	40	48 1/16	3/4	.....	20
21	Ford.....V8-60	.....	CP	Own	Own	.....	.....	DD	.....	.....	AC	Own	Ce	FB	Yes	Yes	TF	.....	13	Yes	1½	4¾	1½	MH	1	.....	28	.....	.....	Own	21
22	Ford.....V8-85	.....	CP	AC	Own	.....	.....	DD	.....	.....	AC	Own	Ce	FB	Yes	Yes	TF	.....	22	Yes	1¾	4¾	1¾	MH	1	.....	28	.....	.....	Own	22
23	Graham-DeL. & Custom.....108	16	CP	AC	Car	.....	1⅜	SD	Aut	Car	AC	Old	Ce	FB	Det	Yes	Cel	Har	14	Yes	.....	.....	.....	.....	1	Var	38	44†	21/32	SC	23
24	Graham-Sch. & Cus. Sch.....107	16	CP	AC	Car	.....	1⅜	SD	No	Car	AC	Old	Ce	FB	Det	Yes	Cel	Har	15	Yes	MH	MH	MH	MH	1	Var	38	44†	21/32	SC	24
25	Hudson-Six.....40	12½	CP	AC	Car	WA1-454-S	1¼	SD	Man	Yes	AC	Old	Ce	FB	Ful	No	Cel	McC	13	No	1⅝	8½	1½	10	1	Go-G	46	44⅝	21/32	Own	25
26	Hudson-Super & C. C. Six..41-43	16½	CP	AC	Car	WDO-461-S	1	DD	Aut	Yes	AC	Old	Ce	FB	Ful	No	Cel	McC	13	No	1⅝	8½	1½	10	1	Go-G	46	44⅝	21/32	Own	26
27	Hudson-Eight & C. C. Eight 44-47	16½	CP	AC	Car	WDO-455-S	1¼	DD	Aut	Car	AC	Old	Ce	FB	Ful	Yes	Cel	McC	18	No	1⅝	10	1½	7¾	1	Go-G	46	44⅝	21/32	Own	27
28	La Salle.....40-50, 40-52	22	VP	AC	Car	WDO-460-S	1¼	DD	No	Car	AC	Wal	Ce	FB	No	No	TF	Har	25	Yes	2	MH	1¼	(a)	1	Var	34	33 11/16†	1 1/4	Hay	28
29	Lincoln.....V12	.....	VP	AC	.....	.....	.....	.....	.....	.....	AC	.....	Ce	FB	Yes	Yes	TF	.....	32½	.....	1¾	.....	1¾	.....	1	.....	45	.....	.....	Own	29
30	Lincoln-Zephyr.....V12	.....	.....	AC	SG	.....	.....	DD	Aut	.....	AC	Own	Ce	FB	Yes	Yes	TF	McC	30	Yes	1¾	.....	1¾	MH	1	.....	28	.....	.....	Own	30
31	Mercury.....V8-95	.....	.....	AC	Own	.....	.....	DD	.....	.....	AC	Own	Ce	FB	Yes	Yes	TF	.....	21¼	Yes	1¾	.....	1¾	MH	1	.....	28	.....	.....	Own	31
32	Nash-LaFayette.....4010	20	VP	AC	Car	WDO-458-S	1¼	DD	Aut	Car	AC	Wal	Ce	FG	Dole	No	TF	McC	19	Yes	1½	3¼	1¾	9	1	Gdy	32	48½	21/32	SC	32
33	Nash-Ambassador 6.....4020	20	VP	AC	Car	WA-435-S	1¼	SD	Aut	Car	AC	Wal	Ce	FG	Dole	No	TF	McC	17½	Yes	1½	3¼	1¾	8¼	1	Gdy	32	48⅛	21/32	SC	33
34	Nash-Ambassador 8.....4080	20	VP	AC	Car	WDO-465-S	1¼	DD	Aut	Car	AC	Wal	Ce	FG	Dole	No	TF	McC	18½	Yes	1½	3¼	1¾	6½	1	Gdy	32	48⅛	21/32	SC	34
35	Oldsmobile-Six.....60	17	CP	AC	Car	WA1-466-S	1¼	SD	Aut	Car	AC	Var	Ce	FB	Har	Yes	Cel	Har	17¾	Yes	1¾	12	1½	8	1	Var	32	44 1/16†	21/32	Own	35
36	Oldsmobile-Six.....70	17	CP	AC	Car	WA1-466-S	1¼	SD	Aut	Car	AC	Var	Ce	FB	Har	Yes	Cel	Har	17¾	Yes	1¾	12	1½	8	1	Var	32	44 1/16†	21/32	Own	36
37	Oldsmobile-Custom 8 Cruiser....	17	CP	AC	Car	WDO-389-S	1¼	DD	Aut	Car	AC	Var	Ce	FB	Har	No	Cel	Har	21	Yes	1¾	17½	1½	6⅞	1	Var	32	44 1/16†	21/32	Own	37
38	Packard-One Ten.....1800	17	CP	AC	Str	BXOV-26	1¼	SD	Aut	Str	AC	.....	Ce	FB	Yes	Yes	Cel	McC	17	No	1¾	7½	1¾	3	1	.....	42	49¼	3/4	.....	38
39	Packard-One Twenty.....1801	21	CP	AC	Str	EE-16	1	DD	Aut	Str	AC	Wal	Ce	FB	.....	Yes	Cel	McC	18	No	1¾	7½	1¾	3	1	.....	42	49¼	3/4	.....	39
40	Packard-Super Eight....1803-4-5	21	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Wal	Ce	FB	.....	Yes	TF	M-M	20	No	1¾	6¾	1¾	3	1	.....	42	52¼	1	.....	40
41	Packard-Cus. Sup. Eight.1806-7-8	21	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Wal	Ce	FB	.....	Yes	TF	M-M	20	No	1¾	6¾	1¾	3	1	.....	42	52¼	1	.....	41
42	Plymouth-Roadking.....P-9	17	CP	AC	Car	BB-D6A2	1¼	SD	Aut	No	Yes	.....	Ce	FB	.....	No	Cel	Fed	14	Yes	1¾	9	1½	9¼	1	.....	40	48 1/16	3/4	.....	42
43	Plymouth-DeLuxe.....P-10	17	CP	AC	Car	BB-D6A2	1¼	SD	Aut	No	Yes	.....	Ce	FB	.....	Yes	Cel	Jam	14	Yes	1¾	7½	1½	9¼	1	.....	40	48 1/16	3/4	.....	43
44	Pontiac-Special 6.....40-25	16	CP	AC	Car	WA1-463-S	1¼	SD	Aut	Car	AC	Var	Ce	FB	Har	Yes	Cel	Har	16	Yes	1½	14¼	1¾	9¾	1	Var	32	48¼	3/4	Own	44
45	Pontiac-DeLuxe 6.....40-26	16	CP	AC	Car	WA1-463-S	1¼	SD	Aut	Car	AC	Var	Ce	FB	Har	Yes	Cel	Har	16	Yes	1½	14¼	1¾	9¾	1	Var	32	48¼	3/4	Own	45
46	Pontiac-DeLuxe 8.....40-28	16	CP	AC	Car	WA1-462-S	1¼	SD	Aut	Car	AC	Var	Ce	FB	Har	Yes	Cel	Har	19	Yes	1½	13⅛	1¾	9¾	1	Var	32	48¼	3/4	Own	46
47	Pontiac-Torpedo 8.....40-29	16	CP	AC	Car	WDO-469-S	1 1/16	DD	Aut	Car	AC	Var	Ce	FB	Har	Yes	Cel	Har	19	Yes	1½	13½	1¾	9¾	1	Var	32	48¼	3/4	Own	47
48	Studebaker-Champion 6.....2G	15	CP	AC	Car	WO-468-S	1	SD	Aut	No	AC	Wal	Ce	FB	B&B	No	Cel	McC	10½	Yes	1¼	MH	1¼	8¼	1	Ga	48	37¾	11/32	H-S	48
49	Studebaker-Commander 6....10A	18	CP	AC	Str	BXO-26	1¼	SD	Aut	Str	AC	Wal	Ce	FB	F-B	Yes	TF	McC	14½	Yes	2	MH	1¼	11½	1	Ga	46	47½	21/32	Hay	49
50	Studebaker-President 8.....6C	18	CP	AC	Str	AAO-161	1	DD	Aut	Str	AC	Bur	Ce	FB	Var	Yes	TF	McC	17	Yes	2	MH	1¼	11½	1	Ga	46	47½	21/32	Hay	50
51	Willys.....440	10½	CP	AC	Car	WO-450-S	1	SD	Aut	No	AC	McK	Ce	FB	Har	.....	Cel	Jam	11¾	Yes	1 1/16	7⅝	1½	9¾	1	Var	42	42 11/32	11/32	Own	51

ABBREVIATIONS:
†—Inside diameter
*—Pitch circumference
2P—Two mechanical pumps
(a)—R. H. 9½ inches, L. H. 8½ inches
(b)—L. H. 407-S; R. H. 408-S
(c)—Air cooled by means of blower integral with flywheel
AC—AC Spark Plug Co.
Aut—Automatic
B&B—Bishop & Babcock
Bur—Burgess Muffler
Car—Carter Carburetor Co.
Ce—Centrifugal
Cel—Cellular
CP—Camshaft Pump
DD—Dual Downdraft
Det—Detroit Lubricator Co.
ET—Elbow Type
FB—Fan Belt
F-B—Fulton or Bishop & Babcock
Fed—Fedders Mfg. Co.
FG—Direct drive from Generator
Ful—Fulton (water circulation)
Ga—Gates Rubber Co.
Gdy—Goodyear Tire & Rubber Co
Go-G—Goodrich or Gates
Gr—Goodrich Rubber Co.
Gr—Gravity
Har—Harrison Radiator Div.
Hay—Hayes Industries, Inc.
H-S—Hayes or Schwitzer-Cummins
Jam—Jamestown
Man—Manual
McC—McCord Radiator
McK—McKenzie
MH—Molded Hose
M-M—Modine & McCord
Mod—Modine Manufacturing Co.
No—No or None
Old—Oldberg Manufacturing Co.
Rex—Rex Engineering Co.
SC—Schwitzer-Cummins
SD—Single Downdraft
SG—Stromberg or Chandler Groves
Str—Stromberg Carburetor Div.
SU—Single Updraft
TF—Tube and Fin
Til—Tillotson
Var—Various
VP—Vacuum Pump
Wal—Walker Mfg. Co.
Zen—Zenith Carburetor Co.

SPECIFICATIONS

Ignition Units and Batteries

Line Numbers	PASSENGER CAR MAKE AND MODEL	IGNITION UNIT									COIL		Ignition Lock Make	SPARK PLUG				Ignition Cable Make	BATTERY							Line Numbers
		Make	Mode	Degrees Advanced		Breaker Gap	Cam Angle (Deg.)	Timing			Amperage Draw										Bench Charging Rate					
				Automatic	Vacuum			Marks on	Spark Occurs Deg.—TDC.	Firing Order	Engine Stopped	Engine Idling		Make	Model	Thread Size	Gap		Make	Capacity—Amp. Hrs. at 20-hour rate	Plates per Cell	Start (Amps.)	Fin. (Amps.)	Terminal Grounded	Location	
1	Bantam 65	AL	IGW-4105-C	No	No	.022	46	No	4BT	1,3,4,2	7.0	3.5	Dg	Ch	H-10	14	.025	Pac	AL	65	11			Neg	HD	1
2	Buick-Special 40-40	DR	1110801	26	11	.015	31	FW	4BT	1,6,2,5,8,3,7,4	4.5	2.5	DB	AC	46	14	.025	Pac	DR	115	17	7	7	Neg	RH	2
3	Buick-Super 40-50	DR	1110801	26	11	.015	31	FW	4BT	1,6,2,5,8,3,7,4	4.5	2.5	DB	AC	46	14	.025	Pac	DR	115	17	7	7	Neg	RH	3
4	Buick-Century 40-60	DR	1110805	26	12	.015	31	FW	6BT	1,6,2,5,8,3,7,4	4.5	2.5	DB	AC	46	14	.025	Pac	DR	115	17	7	7	Neg	RH	4
5	Buick-Roadmaster 40-70	DR	1110805	26	12	.015	31	FW	6BT	1,6,2 5,8,3,7,4	4.5	2.5	DB	AC	46	14	.025	Pac	DR	115	17	7	7	Neg	RH	5
6	Buick-Limited 40-80	DR	1110805	26	12	.015	31	FW	6BT	1,6,2,5,8,3,7,4	4.5	2.5	DB	AC	46	14	.025	Pac	DR	115	17	7	7	Neg	RH	6
7	Buick-Limited 40-90	DR	1110805	26	12	.015	31	FW	6BT	1,6,2,5,8,3,7,4	4.5	2.5	DB	AC	46	14	.025	Pac	DR	115	17	7	7	Neg	RH	7
8	Cadillac-V8 40-60S	DR	1110806	24	18	.015	31	TD	5BT	1,8,7,3,6,5,4,2	4.4	2.2	DR	AC	104	10	.027	Pac	DR	115	17	10	8	Pos	RF	8
9	Cadillac-V8 40-62	DR	1110806	24	18	.015	31	TD	5BT	1,8,7,3,6,5,4,2	4.4	2.2	DR	AC	104	10	.027	Pac	DR	115	17	10	8	Pos	UF	9
10	Cadillac-V8 40-72	DR	1110806	24	18	.015	31	TD	5BT	1,8,7,3,6,5,4,2	4.4	2.2	DR	AC	104	10	.027	Pac	DR	115	17	10	8	Pos	UF	10
11	Cadillac-V8 40-75	DR	1110806	24	18	.015	31	TD	5BT	1,8,7,3,6,5,4,2	4.4	2.2	DR	AC	104	10	.027	Pac	DR	115	17	10	8	Pos	RF	11
12	Cadillac-V16 40-90	DR	(a)	20	No	.015	31	TD	6BT	(b)	4.4	2.2	DR	AC	104	10	.032	Pac	DR	125	17	10	8	Pos	RF	12
13	Chevrolet-Master 85	DR	1110052	37	17	.021	36	FW	5BT	1,5,3,6,2,4	4.8	2.5	DR	AC	44	14	.040	DR	DR	100	15	6	5	Neg	RH	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	DR	1110052	37	17	.021	36	FW	5BT	1,5,3,6,2,4	4.8	2.5	DR	AC	44	14	.040	DR	DR	100	15	6	5	Neg	RH	14
15	Chrysler-Windsor & Royal C-25	AL	IGS-4108A-1	12	11	.020	38	VD	TC	1,5,3,6,2,4	5.0	2.2		CA		14	.025		Wil	119	15			Pos	LS	15
16	Chrysler-Saratoga & N. Y. C-26	AL	IGT-4101A-2	12	8	.017	27	VD	TC	1,6,2,5,8,3,7,4	5.0	2.2		CA		14	.025		Wil	135	19			Pos	LS	16
17	Chrysler-Crown Imperial C-27	AL	IGT-4101B-2	12	6	.017	27	VD	3BT	1,6,2,5,8,3,7,4	5.0	2.2		CA		14	.025		Wil	135	19			Pos	LS	17
18	Crosley A	AL	IGW-4142A	14		.020	37	FW	3BT	1,2	5.0	2.0	Dg	AL	A-5	14	.025	Pac	AL	85	11	5	5	Pos	UH	18
19	DeSoto-Custom S-7	AL	IGS-4108-1	12	7	.020	38	VD	2BT	1,5,3,6,2,4	5.0	2.2		CA		14	.025		Wil	105	15			Pos	LS	19
20	Dodge D-14-17	AL	IGS-4107-1	12	8	.020	38	VD	TC	1,5,3,6,2,4	5.0	2.2		CA		14	.025		AL	95	15			Pos	LS	20
21	Ford V8-60	Own		20		.015			4BT	1,5,4,8,6,3,7,2				Ch	H-10	14	.025		Own	120	17			Pos	UH	21
22	Ford V8-85	Own		20		.015			4BT	1,5,4,8,6,3,7,2				Ch	H-10	14	.025		Own	120	17			Pos	UH	22
23	Graham-DeL. & Custom 108	DR	623-A	16	10	.018		FW	TC	1,5,3,6,2,4				Ch	J-10	14	.025	Pac	Wil	95	15			Pos	LH	23
24	Graham-Sch. & Cus. Sch. 107	DR	623-S	16	10	.018		FW	4½BT	1,5,3,6,2,4				Ch	J-10	14	.025	Pac	Wil	105	15			Pos	LH	24
25	Hudson-Six 40	AL	IGW-4203	14		.020	35	FW	TC	1,5,3,6,2,4	4.5	2.5	Mit	Ch	J-8	14	.032	Es	Nat	96	17			Pos	LH	25
26	Hudson-Super & C. C. Six 41-43	AL	IGW-4203	14		.020	35	FW	TC	1,5,3,6,2,4	4.5	2.5	Mit	Ch	J-8	14	.032	Es	Nat	96	17			Pos	LH	26
27	Hudson-Eight & C. C. Eight 44-47	AL	IGP-4008A	17		.017	27	FW	TC	1,6,2,5,8,3,7,4	4.5	2.5	Mit	Ch	J-8	14	.032	Es	Nat	108	19			Pos	LH	27
28	La Salle 40-50, 40-52	DR	1110806	22	18	.015	31	TD	5BT	1,8,7,3,6,5,4,2	4.4	2.2		AC	104	10	.027	Pac	DR	115	17	10	8	Pos	UF	28
29	Lincoln V12			20		.015			7BT	(e)				Ch	H-10	14	.025									29
30	Lincoln-Zephyr V12	Own		20		.015			4BT	(e)				Ch	H-10	14	.028		Own	120	17			Pos	UH	30
31	Mercury V8-95	Own		20		.015			4BT	1,5,4,8,6,3,7,2				Ch	H-10	14	.025		Own	120	17			Pos	UH	31
32	Nash-LaFayette 4010	AL	IGS-4104	5	5.5	.020	38	VD	TC	1,5,3,6,2,4	4.0	2.5	Oak	AL	B-7	18	.025	AEM	USL	95	15	8	6	Pos	LS	32
33	Nash-Ambassador 6 4020	AL	IGE-4019A	11		.020	35	VD	6BT	1,5,3,6,2,4			Oak	AC	45	14	.025	AEM	USL	105	15	9	7	Pos	LS	33
34	Nash-Ambassador 8 4080	AL	IGK-4102	12		.017	28	VD	9BT	1,6,2,5,8,3,7,4			Oak	AC	45	14	.025	AEM	USL	120	17	12	10	Pos	LS	34
35	Oldsmobile-Six 60	DR	647-F	28	20	.021	35	FW	TC	1,5,3,6,2,4	4.5	2.0	DR	AC	45	14	.040	Pac	DR	100	15	12	4	Neg	UH	35
36	Oldsmobile-Six 70	DR	647-F	28	20	.021	35	FW	TC	1,5,3,6,2,4	4.5	2.0	DR	AC	45	14	.040	Pac	DR	100	15	12	4	Neg	UH	36
37	Oldsmobile-Custom 8 Cruiser	DR	1110802	30	15	.015	31	FW	2BT	1,6,2,5,8,3,7,4	4.5	2.0	DR	AC	45	14	.030	Pac	DR	115	17	12	4	Neg	UH	37
38	Packard-One Ten 1800	AL	IGW-4143	9		.020	35		6BT	1,5,3,6,2,4	2.5	0.5		(d)	(d)	10	.028		PL	95	15	8	6	Pos	LS	38
39	Packard-One Twenty 1801	AL	IGP-4501	8		.017	27		8BT	1,6,2,5,8,3,7,4	2.5	0.5		(d)	(d)	10	.028		Wil	114	17			Pos	LS	39
40	Packard-Super Eight 1803-4-5	AL	IGT-4102	12	5.5	.017	27		5BT	1,6,2,5,8,3,7,4	2.5	0.5		(d)	(d)	10	.028		Wil	114	17			Pos	LS	40
41	Packard-Cus. Sup. Eight 1806-7-8	AL	IGT-4102	12	5.5	.017	27		5BT	1,6,2,5,8,3,7,4	2.5	0.5		(d)	(d)	10	.028		Wil	114	17			Pos	LS	41
42	Plymouth-Roadking P-9	AL	IGS-4109-1	11	10	.020	38	FP	TC	1,5,3,6,2,4	5.0	2.2		CA		14	.025		AL	90	13	8	6	Pos	LS	42
43	Plymouth-DeLuxe P-10	AL	IGS-4109-1	11	10	.020	38	FP	TC	1,5,3,6,2,4	5.0	2.2		CA		14	.025		AL	90	13	8	6	Pos	LS	43
44	Pontiac-Special 6 40-25	DR	647-D	28.5	15	.021	35	FW	4BT	1,5,3,6,2,4			DR	AC	45	14	.025	Pac	DR	100	15			Neg	LH	44
45	Pontiac-DeLuxe 6 40-26	DR	647-D	28.5	15	.021	35	FW	4BT	1,6,2,5,8,3,7,4			DR	AC	45	14	.025	Pac	DR	100	15			Neg	LH	45
46	Pontiac-DeLuxe 8 40-28	DR	1110804	28	20	.015	31	FW	4BT	1,6,2,5,8,3,7,4			DR	AC	45	14	.025	Pac	DR	100	15			Neg	LH	46
47	Pontiac-Torpedo 8 40-29	DR	1110804	28	20	.015	31	FW	4BT	1,6,2,5,8,3,7,4			DR	AC	45	14	.025	Pac	DR	100	15			Neg	LH	47
48	Studebaker-Champion 6 2G	AL	IGW-4131	7	9	.020	35	FW	1BT	1,5,3,6,2,4	4.5	1.0	YT	Ch	8	18	.025	Bel	Wil	90	13	5.7	5.7	Pos	HD	48
49	Studebaker-Commander 6 10A	AL	IGW-4101	10	6	.020	35	VD	2BT	1,5,3,6,2,4	4.5	1.0	YT	Ch	8	18	.025	SE	Wil	95	15	5.7	5.7	Pos	LH	49
50	Studebaker-President 8 6C	DR	662-M	29	12	.021	35	VD	TC	1,6,2,5,8,3,7,4	4.5	1.0	YT	Ch	8	18	.025	SE	Wil	95	15	5.7	5.7	Pos	LH	50
51	Willys 440	AL	IGW-4129	9.5	10	.020	41	FW	TC	1,3,4,2	4.0	2.5	Dg	Ch	J-8	14	.025	Var	Nat	76	13			Neg	RH	51

ABBREVIATIONS:

(a)—Left side, 1110601; right side, 1110602
(b)—1, 4, 9, 12, 3, 16, 11, 8, 15, 14, 7, 6 13, 2, 5, 10
(c)—Torquematic retard 2½ degrees
(d)—AC104 or Champion Y4
e)—1, 4, 9, 8, 5, 2, 11, 10, 3, 6, 7, 12
AEM—American Enameled Magnet Wire Co.
AL—Electric Auto-Lite Co.
Bel—Belden
BT—Before top center
CA—Champion J-8 or Auto-Lite A-7
Ch—Champion Spark Plug Co
DB—Delco-Remy and Briggs & Stratton
Del—Delco
DR—Delco-Remy
Es—Essex Wire Corp.
FP—Fan drive pulley
HD—Under hood in dash
Dg—H. A. Douglas
FW—Flywheel
LH—Under hood, left side
LS—Under left front seat
Mit—Mitchell Specialty Co.
Nat—National Battery Co.
Neg—Negative
No—No or none
Oak—Oakes Products
Pac—Packard Electric Co.
PL—Prest-O-Lite
Pos—Positive
RF—Under right front fender
RH—Under hood on right side
SE—Sterling Electric
TC—Top center
TD—On timing disc
UF—Under floorboards
UH—Under hood
Var—Various
VD—On vibration damper
Wil—Willard Storage Battery Co.
YT—Yale & Towne Mfg. Co

Starting Motors, Lamps and Horns

Line Numbers	PASSENGER CAR MAKE AND MODEL	STARTING MOTOR																LAMPS					HORN				
					LOCK TEST			NO LOAD TEST						FLYWHEEL				HEAD									
		Make	Model	Cranking Speed	Amperage Draw	Volts	Torque (Lb. Ft.)	Amperage Draw	Volts	R.P.M.	Type of Drive	Starting Operation	Pinion Meshes	No. of Teeth	Face Width of Teeth	Teeth Integral	Ratio to Starter	Make	Location	Bulb, Candlepower	Type of Bulb	Tail and Stop—Make	Type	Number Used	Make	Amperage Draw of Each	Line Numbers
1	Bantam 65	AL	MAK-4001	200	520	4.00	7	65	5.5	5000	SG	Pbd	F	80	3/16	SR	8.00	C-B	IF	32-21	PF	C-B	Vib	1	Sch	7	1
2	Buick-Special 40-40	DR	1107005	.....	525	3.37	12	65	5.0	5000	SG	Dap	F	146	33/64	SR	16.22	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	2
3	Buick-Super 40-50	DR	1107005	.....	525	3.37	12	65	5.0	5000	SG	Dap	F	146	33/64	SR	16.22	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	3
4	Buick-Century 40-60	DR	1107908	.....	600	3.00	16	65	5.0	5500	SG	Dap	F	156	33/64	SR	17.33	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	4
5	Buick-Roadmaster 40-70	DR	1107908	.....	600	3.00	16	65	5.0	5500	SG	Dap	F	156	33/64	SR	17.33	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	5
6	Buick-Limited 40-80	DR	1107908	.....	600	3.00	16	65	5.0	5500	SG	Dap	F	156	33/64	SR	17.33	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	6
7	Buick-Limited 40-90	DR	1107908	.....	600	3.00	16	65	5.0	5500	SG	Dap	F	156	33/64	SR	17.33	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	7
8	Cadillac-V8 40-60S	DR	1107912	.....	600	3.00	16	65	5	5500	SG	Pbd	F	156	1/2	SR	17.00	Guide	RS	45-35	SB	Guide	Air	2	DR	19-20	8
9	Cadillac-V8 40-62	DR	1107912	.....	600	3.00	16	65	5	5500	SG	Pbd	F	156	1/2	SR	17.00	Guide	RS	45-35	SB	Guide	Air	2	DR	19-20	9
10	Cadillac-V8 40-72	DR	1107912	.....	600	3.00	16	65	5	5500	SG	Pbd	F	156	1/2	SR	17.00	Guide	RS	45-35	SB	Guide	Air	2	DR	19-20	10
11	Cadillac-V8 40-75	DR	1107912	.....	600	3.00	16	65	5	5500	SG	Pbd	F	156	1/2	SR	17.00	Guide	RS	45-35	SB	Guide	Air	2	DR	19-20	11
12	Cadillac-V16 40-90	DR	000783	.....	500	3.00	19	70	5	3000	SG	Pbd	F	156	1/2	SR	17.00	Guide	IF	45-35	SB	Guide	Air	2	DR	19-20	12
13	Chevrolet-Master 85	DR	1107009	65	525	3.37	12	65	5.4	5000	OC	Dsp	F	139	1/2	SR	15.44	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	DR	1107009	65	525	3.37	12	65	5.4	5000	OC	Dsp	F	139	1/2	SR	15.44	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	14
15	Chrysler-Windsor & Royal C-25	AL	MAX-4020A	.....	880	4.00	25	65	5.5	5300	SG	Pbd	F	146	1/2	SR	16.22	C-B	IF	45-35	SB	C-B	Vib	1	AL	7	15
16	Chrysler-Saratoga & N. Y. C-26	AL	MAX-4037	.....	880	4.00	25	65	5.5	5300	SG	Pbd	F	146	7/16	SR	16.22	C-B	IF	45-35	SB	C-B	Air	1	AL	7	16
17	Chrysler-Crown Imperial C-27	AL	MAX-4020A	.....	880	4.00	25	65	5.5	5300	SG	Pbd	F	146	1/2	SR	16.22	C-B	IF	45-35	SB	C-B	Air	2	AL	17-20	17
18	Crosley A	AL	MZ-4077	200	560	4.00	12	70	5.5	5000	OC	Dsp	R	99	5/8	Int	9.90	C-B	SH	32-21	.....	C-B	Vib	1	Spa	5	18
19	DeSoto-Custom S-7	AL	MAW-4016	.....	670	4.00	18	65	5.5	4900	OC	Dsp	F	146	1/2	SR	16.22	Hall	IF	45-35	SB	C-B	Air	2	AL	17-20	19
20	Dodge D-14-17	AL	MZ-4062	.....	560	4.00	12	60	5.5	5000	OC	Dsp	F	146	1/2	SR	16.22	C-B	IF	45-35	SB	C-B	Vib	1	AL	.....	20
21	Ford V8-60	Own	.....	100	500	.....	14	.....	.....	.....	SG	Pbd	R	122	3/8	SR	13.55	.....	.....	45-35	SB	.....	.....	.....	.....	11-13	21
22	Ford V8-85	Own	.....	100	500	.....	14	.....	.....	.....	SG	Pbd	R	112	3/8	SR	11.20	.....	.....	45-35	SB	.....	.....	.....	.....	11-13	22
23	Graham-DeL. & Custom 108	DR	738-T	.....	475	3.6	12	65	5.0	5000	OC	Dsp	F	130	1/2	SR	14.40	Hall	IF	32-32	.....	Hall	Vib	1	DR	13	23
24	Graham-Sch. & Cus. Sch. 107	DR	738-T	.....	475	3.6	12	65	5.0	5000	OC	Dsp	F	130	1/2	SR	14.40	Hall	IF	32-32	.....	Hall	Vib	1	DR	13	24
25	Hudson-Six 40	AL	MZ-4079	150	560	4.00	12	60	5.5	5000	SG	Pbd	R	134	11/32	SR	14.90	Hall	IF	45-35	SB	C-B	Vib	1	Sch	15	25
26	Hudson-Super & C. C. Six 41-43	AL	MZ-4079	150	560	4.00	12	60	5.5	5000	SG	Pbd	R	134	11/32	SR	14.90	Hall	IF	45-35	SB	C-B	Air	2	SW	15	26
27	Hudson-Eight & C. C. Eight 44-47	AL	MAB-4103	150	750	4.00	22	60	5.5	3700	SG	Pbd	R	134	11/32	SR	14.90	Hall	IF	45-35	SB	C-B	Air	2	SW	15	27
28	La Salle 40-50, 40-52	DR	1107912	.....	600	3.00	16	65	5	5500	SG	Pbd	F	156	1/2	SR	17.00	Guide	IF	45-35	SB	Guide	Air	2	DR	19-20	28
29	Lincoln V12	.....	.....	.....	975	.....	48	.....	.....	.....	SG	Pbd	F	116	.....	SR	11.60	.....	.....	45-35	SB	.....	.....	.....	.....	.....	29
30	Lincoln-Zephyr V12	Own	.....	100	.....	.....	14	.....	.....	.....	SG	Pbd	R	112	3/8	SR	11.20	.....	.....	45-35	SB	.....	.....	.....	.....	11-13	30
31	Mercury V8-95	Own	.....	100	500	.....	14	.....	.....	.....	SG	Pbd	R	112	3/8	SR	11.20	.....	.....	45-35	SB	.....	.....	.....	.....	11-13	31
32	Nash-LaFayette 4010	AL	MAB-4076	160	750	4.00	22	60	5.5	3700	SG	Dcp	R	104	1/2	SR	10.40	C-B	IF	40-32	SB	C-B	Vib	1	DR	.....	32
33	Nash-Ambassador 6 4020	AL	MAB-4076	160	750	4.00	22	60	5.5	3700	SG	Dcp	R	104	1/2	SR	10.40	C-B	IF	40-32	SB	C-B	Vib	1	DR	.....	33
34	Nash-Ambassador 8 4080	AL	MAB-4104	160	750	4.00	22	60	5.5	3700	SG	Dcp	R	113	33/64	SR	11.30	C-B	IF	40-32	SB	C-B	Vib	1	DR	.....	34
35	Oldsmobile-Six 60	DR	1107007	100	525	3.37	12	65	5.0	5000	MG	Dsp	F	148	1/2	SR	16.11	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	35
36	Oldsmobile-Six 70	DR	1107007	100	525	3.37	12	65	5.0	5000	MG	Dsp	F	145	1/2	SR	16.11	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	36
37	Oldsmobile-Custom 8 Cruiser	DR	1107907	100	600	3.00	15	60	5.0	6000	MG	Dsp	F	145	1/2	SR	16.11	Guide	IF	45-35	SB	Guide	Vib	2	DR	19-20	37
38	Packard-One Ten 1800	AL	MZ-4078	.....	560	4.00	12	60	5.5	5000	SG	Pbd	F	140	.....	SR	20-19	Hall	BF	45-35	SB	Hall	.....	2	Spa	22-25	38
39	Packard-One Twenty 1801	AL	MAW-4018	.....	670	4.00	18	65	5.5	4900	SG	Pbd	F	140	.....	SR	20-19	Hall	BF	45-35	SB	Hall	.....	2	Spa	22-25	39
40	Packard-Super Eight 1803-4-5	AL	MAX-4041	.....	906	4.00	46	77	5.5	2695	SG	Pbd	F	140	.....	SR	20-19	Hall	BF	45-35	SB	Hall	.....	2	Spa	22-25	40
41	Packard-Cus. Sup. Eight 1806-7-8	AL	MAX-4041	.....	906	4.00	46	77	5.5	2695	SG	Pbd	F	140	.....	SR	20-19	Hall	BF	45-35	SB	Hall	.....	2	Spa	22-25	41
42	Plymouth-Roadking P-9	AL	MZ-4062	.....	560	4.00	12	60	5.5	5000	OC	Dsp	F	146	1/2	SR	16.22	C-B	IF	45-35	SB	C-B	Vib	1	AL	7	42
43	Plymouth-DeLuxe P-10	AL	MZ-4062	.....	560	4.00	12	60	5.5	5000	OC	Dsp	F	146	1/2	SR	16.22	C-B	IF	45-35	SB	C-B	Vib	1	AL	7	43
44	Pontiac-Special 6 40-25	DR	1107022	.....	525	3.37	12	65	5	5000	OC	Dsp	F	140	1/2	SR	15.56	Guide	IF	50	SB	Guide	Vib	2	DR	16-18	44
45	Pontiac-DeLuxe 6 40-26	DR	1107022	.....	525	3.37	12	65	5	5000	OC	Dsp	F	140	1/2	SR	15.56	Guide	IF	50	SB	Guide	Vib	2	DR	16-18	45
46	Pontiac-DeLuxe 8 40-28	DR	1107914	.....	600	3.00	15	60	5	6000	OC	Dsp	F	140	1/2	SR	15.56	Guide	IF	50	SB	Guide	Vib	2	DR	16-18	46
47	Pontiac-Torpedo 8 40-29	DR	1107914	.....	600	3.00	15	60	5	6000	OC	Dsp	F	140	1/2	SR	15.56	Guide	IF	50	SB	Guide	Vib	2	DR	16-18	47
48	Studebaker-Champion 6 2G	AL	MZ-4074	130	560	4.00	12	60	5.5	5000	SG	Dcp	R	124	1/2	SR	13.77	Own	IF	40-30	SB	C-B	Vib	1	DR	6	48
49	Studebaker-Commander 6 10A	AL	MAW-4015	130	670	4.00	18	65	5.5	4900	SG	Pbd	F	133	1/2	SR	14.78	Own	IF	40-30	SB	C-B	Air	1	DR	10-12	49
50	Studebaker-President 8 8C	DR	1107903	110	600	3.00	15	60	5.5	5000	SG	Pbd	F	133	1/2	SR	14.78	Own	IF	40-30	SB	C-B	Air	2	DR	10-12	50
51	Willys 440	AL	MZ-4064	185	560	4.00	12	60	5.5	5000	SG	Pbd	F	97	3/8	SR	10.97	C-B	IF	.....	.....	C-B	Vib	1	Sch	.....	51

ABBREVIATIONS:
Air—Airtone
AL—The Electric Auto-Lite Co.
BF—Between fenders and hood
C-B—The Corcoran-Brown Lamp Div.
Dap—Depress accelerator pedal
Dcp—Depress clutch pedal
DR—Delco-Remy Division
Dsp—Depress starter pedal
F—Front
IF—In fenders
Int—Integral
MG—Manual gear
OC—Overrunning clutch
Pbd—Push or pull button on dash board
PF—Prefocus flange type
RS—Radiator shell
SB—Sealed beam
Sch—Schwarze Electric Co.
SG—Solenoid shifted gear with overrunning clutch
SH—Side panel of hood
Spa—Sparton
SR—Steel Ring
SW—Sparks Withington
Vib—Vibrator

SPECIFICATIONS

Generators and Clutches

Line Numbers	PASSENGER CAR MAKE AND MODEL	Make	Mode	Driven By	Type	Charging Control	CUTOUT RELAY: Closes At: Voltage	Armature R.P.M. (Average)	Car Speed M.P.H.	Opens At (Amps. Reverse Current)	MAXIMUM CHARGING RATE: Cold: Amperes	Voltage	R.P.M.	Hot: Amperes	Voltage	R.P.M.	Car Speed—M.P.H.	Ammeter Make	CLUTCH: Make	Type	Power Unit—Make	Vibration Insulator	No. of Driving Discs	No. of Driven Discs	Facings: Material	Inside Diameter	Outside Diameter	Thickness	No. Required	Line Numbers
1	Bantam 65	AL	GAS-4139A		3BR	No	6.4-7		5.0	.5-3	10	8.0	2600	8	8.0	2600	40	SW	Roc	SP	No	No	2	1	Mo	6½	8 7/16	.125	2	1
2	Buick-Special 40-40	DR	1102662	B	Shu	CV	6.3-6.9	880	9.0	0-3.5	33	8.0	2000	34	8.0	2400	20	AC	Own*	SP	No	Sp	2	1	Wo	6¾	10	.125	2	2
3	Buick-Super 40-50	DR	1102662	B	Shu	CV	6.3-6.9	880	9.0	0-3.5	33	8.0	2000	34	8.0	2400	20	AC	Own*	SP	No	Sp	2	1	Wo	6¾	10	.125	2	3
4	Buick-Century 40-60	DR	1102668	B	Shu	CV	6.3-6.9	880	9.0	0-3.5	33	8.0	2000	34	8.0	2400	20	AC	Own*	SP	No	Sp	2	1	Wo	6½	10½	.125	2	4
5	Buick-Roadmaster 40-70	DR	1102668	B	Shu	CV	6.3-6.9	880	9.0	0-3.5	33	8.0	2000	34	8.0	2400	20	AC	Own*	SP	No	Sp	2	1	Wo	6½	10½	.125	2	5
6	Buick-Limited 40-80	DR	1102668	B	Shu	CV	6.3-6.9	880	9.0	0-3.5	33	8.0	2000	34	8.0	2400	20	AC	Own†	SP	No	Sp	2	1	Wo	6½	10½	.125	2	6
7	Buick-Limited 40-90	DR	1102669	B	Shu	CV	6.3-6.9	880	9.0	0-3.5	33	8.0	2000	34	8.0	2400	20	AC	Own†	SP	No	Sp	2	1	Wo	6½	10½	.125	2	7
8	Cadillac-V8 40-60S	DR	1102661	B	Shu	CV	6.3-6.9	375	4.0	0-2				32	8.0	2450		AC	Long	SP-S	No	Sp	2	1	Wo	7	10½	.137	2	8
9	Cadillac-V8 40-62	DR	1102661	B	Shu	CV	6.3-6.9	375	4.0	0-2				32	8.0	2450		AC	Long	SP-S	No	Sp	2	1	Wo	7	10½	.137	2	9
10	Cadillac-V8 40-72	DR	1102661	B	Shu	CV	6.3-6.9	375	4.0	0-2				32	8.0	2450		AC	Long	SP-S	No	Sp	2	1	Wo	7	11	.137	2	10
11	Cadillac-V8 40-75	DR	1102661	B	Shu	CV	6.3-6.9	375	3.5	0-2				32	8.0	2450		AC	Long	SP-S	No	Sp	2	1	Wo	7	11	.137	2	11
12	Cadillac-V16 40-90	DR	1102666	B	Shu	CV	6.3-6.9	375	4.0	0-2				32	8.0	2450		AC	Long	SP	No	Sp	2	1	Wo	7	11½	.125	2	12
13	Chevrolet-Master 85	DR	1102667	B	Shu	CV	6.3-6.9	800	9.5	0-3	39	7.5	1900	34	8.0	2400	27	AC	Own	SP	No	Sp	2	1	Mo	6⅛	9⅛	.135	2	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	DR	1102667	B	Shu	CV	6.3-6.9	800	8.7	0-3	39	7.5	1900	34	8.0	2400	25	AC	Own	SP	No	Sp	2	1	Mo	6⅛	9⅛	.135	2	14
15	Chrysler-Windsor & Royal C-25	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	24		B&B	SP	No	Sp	2	1	Wo	7	10	.125	2	15
16	Chrysler-Saratoga & N. Y. C-26	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	26		B&B	SP	No	Sp	2	1	Wo	6½	11	.125	2	16
17	Chrysler-Crown Imperial C-27	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	23			SP	No	FC	2	1	Wo	6	10	.125	2	17
18	Crosley A	AL	GBM-4619-5	B	3BR	C	6.5-7.2	850	9.8	.5-2.5	15	8.0	2200	12.5	8.0	2400	28	AL	Roc	SP	No				Mo	4	6	.125	2	18
19	DeSoto-Custom S-7	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	24		B&B	SP	No	Sp	2	1	Wo	7	10	.125	2	19
20	Dodge D-14-17	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	24		B&B	SP	No	Sp	2	1	Wo	7	10	.125	2	20
21	Ford V8-60	Own		B	Shu	V	-7.0		10.0	0-3								BI	Long	SP-S	No	Sp	2	1	Mo	6	8½	.137	2	21
22	Ford V8-85	Own		B	Shu	V	-7.0		10.0	0-3								BI	Long	SP-S	No	Sp	2	1	Mo	5¾	9	.137	2	22
23	Graham-DeL. & Custom 108	DR	1100455	B	3BR		6.7-7.5							18	8.3	2900		KS	Long	SP-S	No	Sp	2	1	Mo	6	9½	.125	2	23
24	Graham-Sch. & Cus. Sch. 107	DR	1100007	B	3BR	V	6.5-7.0							28	8.0	3600		KS	Long	SP-S	No	Sp	2	1	Mo	6	9½	.125	2	24
25	Hudson-Six 40	AL	GDS-4801A	B	3BR	V	6.4-7.0	825	9.4	2-6	35	8.0	3000	29	8.0	3100	35	IL	Own	SP-W	No	Sp	2	1	Ck	5¼	8 1/16	.203	90	25
26	Hudson-Super & C. C. Six 41-43	AL	GEC-4801A	B	3BR	V	6.4-7.0	825	9.4	2-6	40	8.0	3200	37	8.0	3600	35	IL	Own	SP-W	No	Sp	2	1	Ck	(a)	(b)	.203	(c)	26
27	Hudson-Eight & C. C. Eight 44-47	AL	GEC-4801A	B	3BR	V	6.4-7.0	825	9.4	2-6	40	8.0	3200	37	8.0	3600	35	IL	Own	SP-W	Ben	Sp	2	1	Ck	6⅜	9 1/16	.203	108	27
28	La Salle 40-50, 40-52	DR	1102661	B	Shu	CV	6.3-6.9	375	4.0	0-2				32	7.4	2450		AC	Long	SP-S	No	Sp	2	1	Wo	6¾	10	.137	2	28
29	Lincoln V12			G	3BR	V	6.7-7.5	450	7.2										Long	SP		Sp	2	1	Wo	7	12	.137	2	29
30	Lincoln-Zephyr V12	Own		B	3BR	V	-7.0		10.0										Long	SP-S	No	Sp	2	1	Wo	6¾	10	.137	2	30
31	Mercury V8-95	Own		B	Shu	V	-7.0		8.0	0-3								BI	Long	SP-S	No	Sp	2	1	Mo	5¾	9	.137	2	31
32	Nash-LaFayette 4010	AL	GDZ-4803A	B	Shu	CV	6.4-7.0			2-6	35	8.0		35	8.0			KS	B&B		No	Sp	2	1		5⅝	9¼	.125	2	32
33	Nash-Ambassador 6 4020	AL	GDZ-4803A	B	Shu	CV	6.4-7.0			2-6	35	8.0		35	8.0			KS	B&B		No	Sp	2	1	Wo	6	10	.125	2	33
34	Nash-Ambassador 8 4080	AL	GDZ-4803B	B	Shu	CV	6.4-7.0			2-6	35	8.0		35	8.0			KS	B&B		No	Sp	2	1	Wo	6	10	.125	2	34
35	Oldsmobile-Six 60	DR	1102664	B	Shu	CV	6.3-6.9	600		0-3	34	7.8		34	8.0	2400	21	AC	B&B	SP	No	Sp	2	1	M-W	6	9¼	.125	2	35
36	Oldsmobile-Six 70	DR	1102664	B	Shu	CV	6.3-6.9	600		0-3	34	7.8		34	8.0	2400	21	AC	B&B	SP	No	Sp	2	1	M-W	6	9¼	.125	2	36
37	Oldsmobile-Custom 8 Cruiser	DR	1102664	B	Shu	CV	6.3-6.9	600		0-3	34	7.8	3200	34	8.0	2400	21	AC	B&B•	SP•	No	Sp	2	1	M-W	7	10	.125	2	37
38	Packard-One Ten 1800	AL	GEA-4801A	B	Shu	CV	6.4-7.0	700		2-6	35	8.0		35	8.0				Long	SP-S	No	Sp	2	1	Wo	6	9½	.125	2	38
39	Packard-One Twenty 1801	AL	GEA-4801A	B	Shu	CV	6.4-7.0	700		2-6	35	8.0		35	8.0				Long	SP-S	No	Sp	2	1	Wo	6	10	.125	2	39
40	Packard-Super Eight 1803-4-5	AL	GEA-4802A	B	Shu	CV	6.4-7.0	700		2-6	35	8.0		35	8.0				Long	SP-S	No	Sp	2	1	Wo	6½	11	.125	2	40
41	Packard-Cus. Sup. Eight 1806-7-8	AL	GEA-4802A	B	Shu	CV	6.4-7.0	700		2-6	35	8.0		35	8.0				Long	SP-S	No	Sp	2	1	Wo	6½	11	.125	2	41
42	Plymouth-Roadking P-9	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	24		B&B	SP	No	Sp	2	1	Wo	6	9¼	.125	2	42
43	Plymouth-DeLuxe P-10	AL	GDZ-4801A	B	Shu	CV	6.4-7.0	1000		2-6	35	8.0	2200	35	8.0	2200	24		B&B	SP	No	Sp	2	1	Wo	6	9¼	.125	2	43
44	Pontiac-Special 6 40-25	DR	1102665	B	Shu	CV	6.3-6.9			0-3	35	8.0	2240	35	8.0	2590	35	AC	Inl.*	SP	No	Sp	2	1	Mo	5¾	9	.125	2	44
45	Pontiac-DeLuxe 6 40-26	DR	1102665	B	Shu	CV	6.3-6.9			0-3	35	8.0	2240	35	8.0	2590	35	AC	Inl.*	SP	No	Sp	2	1	Mo	5¾	9	.125	2	45
46	Pontiac-DeLuxe 8 40-28	DR	1102665	B	Shu	CV	6.3-6.9				35	8.0	2210	35	8.0	2550	35	AC	Inl.*	SP	No	Sp	2	1	Mo	5¾	9¼	.125	2	46
47	Pontiac-Torpedo 8 40-29	DR	1102665	B	Shu	CV	6.3-6.9				35	8.0	2210	35	8.0	2550	35	AC	Inl.*	SP	No	Sp	2	1	Mo	5¾	9¼	.125	2	47
48	Studebaker-Champion 6 2G	AL	GEA-4804A	B	Shu	CV	6.4-7.0	850	8.6	2-6	35	8.0	1600	35	8.0	1800	18	MM	B&B	SP	No	Sp	2	1	M-W	5⅛	7⅞	.125	2	48
49	Studebaker-Commander 6 10A	AL	GEA-4803A	B	Shu	CV	6.4-7.0	800	7.5	2-6	35	8.0	2000	28	8.0	2500	25	SW	B&B	SP	No	Sp	2	1	M-W	6	9¼	.125	2	49
50	Studebaker-President 8 6C	DR	1102671	B	Shu	CV	6.3-6.9	800	9.7	-1	30	8.0	1750	34	8.0	2400	25	SW	Inl.*	SP	No	Sp	2	1	M-W	6	9½	.125	2	50
51	Willys 440	AL	CCJ-4811A	B	3BR	V	6.4-7.0			2-6	25	8.0						KS	Atw	SP	No	Sp	2	1	Mo	5⅛	7⅞	.125	2	51

ABBREVIATIONS:
•—For use only when not equipped with Hydra-Matic Drive
*—Long disc
†—Borg & Beck disc
3BR—Third Brush

(a)—5.125 on Super Six; 6.375 on C.C. 6
(b)—8.687 on Super Six; 9.812 on C.C. 6
(c)—90 on Super Six; 108 on C.C. 6
AC—AC Spark Plug Co.
Atw—Atwood (Borg & Beck disc
B&B—Borg & Beck

B—Belt **Ben**—Bendix
BI—Battery Condition Indicator
C—Current Regulator
Ck—Cork
CV—Current and Voltage Regulator
FC—Fluid Coupling

IL—Indicating Light only
Inl—Inland with Long disc
KS—King-Seeley
MM—Moto-Meter
Mo—Moulded

MW—Front, moulded; rear, woven
No—No or None
Roc—Rockford
Shu—Shunt **Sp**—Springs
SP—Single Plate

SP-S—Semi-centrifugal, single plate, dry
SP-W—Single plate, wet
SW—Stewart-Warner
V—Voltage regulator
Wo—Woven

Transmissions and Universal Joints

Line Numbers	PASSENGER CAR MAKE AND MODEL	Make	No. of Forward Speeds	SHIFTING MECHANISM: Lever Location	SHIFTING MECHANISM: If Steering Column: Meshing of Gears	SHIFTING MECHANISM: If Steering Column: Selection of Gears	SHIFTING MECHANISM: If Automatic: Make	SHIFTING MECHANISM: If Automatic: Type	OVERDRIVE: Make	OVERDRIVE: Lubrication: Capacity (Pts.)	OVERDRIVE: Lubrication: Grade: Summer	OVERDRIVE: Lubrication: Grade: Winter	TRANSMISSION GEAR RATIOS (To-1): In High (5p. 4d. sedan)	In Overdrive	In Low	In Second	In Reverse	Constant Mesh Gears on Second	TYPE GEARS: For Second Speed	For First Speed	For Reverse	Synchronous Meshing Second and Third Gears	LUBRICATION: Capacity (Pts.)	LUBRICATION: Grade: Summer	LUBRICATION: Grade: Winter	UNIVERSAL JOINTS: Make	Number Used	Type	Lubricated With	Drive Medium	Torque Medium	Line Numbers
1	Bantam....65	WG	3	FF	No	No	No	No	No	No	No	No	5.25	No	2.93	1.71	3.90	Y	HI	Sp	Sp	Y	1¼	160	90	UP	2	Met	PL	RS	RS	1
2	Buick-Special....40-40	Own	3	SC	RL	RL	No	No	No	No	No	No	4.40	No	2.67	1.66	3.02	Y	HI	HI	HI	Y	1¾	90EP	90EP	G-S	1	Mp	TL	TT	TT	2
3	Buick-Super....40-50	Own	3	SC	RL	RL	No	No	No	No	No	No	4.40	No	2.67	1.66	3.02	Y	HI	HI	HI	Y	1¾	90EP	90EP	G-S	1	Mp	TL	TT	TT	3
4	Buick-Century....40-60	Own	3	SC	RL	RL	No	No	No	No	No	No	3.90	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	G-S	1	Mp	TL	TT	TT	4
5	Buick-Roadmaster....40-70	Own	3	SC	RL	RL	No	No	No	No	No	No	3.90	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	G-S	1	Mp	TL	TT	TT	5
6	Buick-Limited....40-80	Own	3	SC	RL	RL	No	No	No	No	No	No	4.18	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	G-S	1	Mp	TL	TT	TT	6
7	Buick-Limited....40-90	Own	3	SC	RL	RL	No	No	No	No	No	No	4.55	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	G-S	1	Mp	TL	TT	TT	7
8	Cadillac-V8....40-60S	Own	3	SC	RL	DL	No	No	No	No	No	No	3.92	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	Mec	2	Nb	PL	RS	RS	8
9	Cadillac-V8....40-62	Own	3	SC	RL	DL	No	No	No	No	No	No	3.92	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	Mec	2	Nb	PL	RS	RS	9
10	Cadillac-V8....40-72	Own	3	SC	RL	DL	No	No	No	No	No	No	4.31	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	Mec	2	Nb	PL	RS	RS	10
11	Cadillac-V8....40-75	Own	3	SC	RL	DL	No	No	No	No	No	No	4.58	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	Mec	2	Nb	PL	RS	RS	11
12	Cadillac-V16....40-90	Own	3	SC	RL	DL	No	No	No	No	No	No	4.31	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	Mec	2	Nb	PL	RS	RS	12
13	Chevrolet-Master....85	Own	3	SC	RL	RL	No	No	No	No	No	No	3.73	No	2.94	1.68	2.94	Y	HI	HI	HI	Y	1½	90	90	Own	1	Met	.....	RS	TT	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	Own	3	SC	RL	RL	No	No	No	No	No	No	4.11	No	2.94	1.68	2.94	Y	HI	HI	HI	Y	1½	90	90	Own	1	Met	.....	RS	TT	14
15	Chrysler-Windsor & Royal....C-25	.....	3	SC	RL	Cab	No	No	‡	4	.....	.....	4.10	.722‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	160	90	.....	2	CT	.....	.....	.....	15
16	Chrysler-Saratoga & N. Y....C-26	.....	3	SC	RL	Cab	No	No	‡	4	.....	.....	3.91	.722‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	160	90	.....	2	CT	.....	.....	.....	16
17	Chrysler-Crown Imperial....C-27	.....	(b)	SC	RL	Cab	No†	No†	Yes	4	.....	.....	4.55	.722	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	160	90	.....	(a)	CT	.....	.....	.....	17
18	Crosley....A	WG	3	FF	No	No	No	No	No	No	No	No	5.14	No	3.29	1.72	3.29	Y	Sp	Sp	Sp	N	1	140	90	.....	1	St	.....	TT	TT	18
19	DeSoto-Custom....S-7	.....	3	SC	RL	Cab	No	No	‡	4	.....	.....	4.10	.722	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	160	90	.....	2	CT	.....	.....	.....	19
20	Dodge....D-14-17	.....	3	SC	RL	Cab	No	No	No	No	No	No	4.10	No	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	160	90	.....	2	BT	.....	.....	.....	20
21	Ford....V8-60	Own	3	SC	.....	.....	No	No	No	No	No	No	4.44	No	3.07	1.76	4.01	Y	HI	HI	HI	Y	1¾	160	110	Spi	1	Sb	Ssg	TT	RR	21
22	Ford....V8-85	Own	3	SC	.....	.....	No	No	No	No	No	No	3.78	No	2.80	1.60	3.62	Y	HI	HI	HI	Y	2½	160	110	Spi	1	Sb	Ssg	TT	RR	22
23	Graham-DeL. & Custom....108	WG	3	SC	RL	RL	No	No	WG‡	.....	70	50	4.27	.72‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	4	140	90	UP	2	Met	PL	RS	RS	23
24	Graham-Sch. & Cus. Sch....107	WG	3	SC	RL	RL	No	No	WG‡	.....	70	50	4.27	.72‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	4	140	90	UP	2	Met	PL	RS	RS	24
25	Hudson-Six....40	Own	3	SC	RL	Cab	No	No	WG‡	¾	90EP	90EP	4.55	.722‡	2.94	1.78	3.64	Y	HI	Sp	Sp	Y	2¼	90EP	80EP	Spi	2	Nb	FG	RS	RS	25
26	Hudson-Super & C. C. Six..41-43	Own	3	SC	RL	Cab	No	No	WG‡	¾	90EP	90EP	4.11	.722‡	2.42	1.61	2.99	Y	HI	Sp	Sp	Y	2¼	90EP	80EP	Spi	2	Nb	FG	RS	RS	26
27	Hudson-Eight & C. C. Eight 44-47	Own	3	SC	RL	Cab	No	No	WG	¾	90EP	90EP	4.11	.722	2.42	1.61	2.99	Y	HI	Sp	Sp	Y	2¼	90EP	80EP	Spi	2	Nb	FG	RS	RS	27
28	La Salle....40-50, 40-52	Own	3	SC	RL	DL	No	No	No	No	No	No	3.92	No	2.39	1.53	2.39	Y	HI	HI	HI	Y	2½	90EP	90EP	Mec	2	Nb	PL	RS	RS	28
29	Lincoln....V12	Own	3	FF	.....	.....	No	No	No	No	No	No	4.58	No	2.57	1.76	3.40	Y	HI	HI	HI	Y	6	160	90	Spi	.....	.....	.....	TT	TT	29
30	Lincoln-Zephyr....V12	Own	3	SC	.....	.....	No	No	‡	No	No	No	4.44	‡	2.80	1.60	3.62	Y	HI	HI	HI	Y	2½	160	90	Spi	1	Nb	.....	TT	TT	30
31	Mercury....V8-95	Own	3	SC	.....	.....	No	No	No	No	No	No	3.54	No	2.80	1.60	3.62	Y	HI	HI	HI	Y	2½	160	110	Spi	1	Sb	Ssg	TT	TT	31
32	Nash-LaFayette....4010	Own	3	SC	RL	RL	No	No	WG‡	3	70	50	4.10	.722‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	3½	70	50	Mec	2	Nb	PL	RS	RS	32
33	Nash-Ambassador 6....4020	Own	3	SC	RL	RL	No	No	WG‡	3	70	50	4.10	.722‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	3½	70	50	Mec	2	Nb	PL	RS	RS	33
34	Nash-Ambassador 8....4080	Own	3	SC	RL	RL	No	No	WG‡	3	70	70	4.10	.722‡	2.57	1.55	3.48	Y	HI	HI	HI	Y	3½	70	50	Mec	2	Nb	PL	RS	RS	34
35	Oldsmobile-Six....60	Own	3	SC	RL	RL	No	No	No	No	No	No	4.10	No	2.66	1.66	3.02	Y	HI	HI	HI	Y	2	80	80	Mec	2	Met	PL	SA	SA	35
36	Oldsmobile-Six....70	Own	3	SC	RL	RL	No	No	No	No	No	No	4.30	No	2.66	1.66	3.02	Y	HI	HI	HI	Y	2	80	80	Mec	2	Rb	PL	SA	SA	36
37	Oldsmobile-Custom 8 Cruiser....	Own	4	SC	Aut	Aut	Own	Hy	See	Note	.....	.....	See	Note	.....	.....	.....	Y	See	Note	.....	Y	10	.....	.....	Mec	2	Rb	PL	SA	SA	37
38	Packard-One Ten....1800	Own	3	SC	.....	.....	No	No	WG‡	1¼	140	90	4.30	.763‡	2.43	1.53	3.16	Y	HI	HI	HI	Y	2	140	90	Mec	2	Rb	GG	RS	.....	38
39	Packard-One Twenty....1801	Own	3	SC	.....	.....	No	No	WG‡	1¼	140	90	4.09	.770‡	2.43	1.53	3.16	Y	HI	HI	HI	Y	2	140	90	Mec	2	Rb	GG	RS	.....	39
40	Packard-Super Eight....1803-4-5	Own	3	SC	.....	.....	No	No	WG‡	1¼	140	90	(d)	(c)	2.43	1.53	3.16	Y	HI	HI	HI	Y	2	140	90	Mec	2	Rb	GG	RS	.....	40
41	Packard-Cus. Sup. Eight.1806-7-8	Own	3	SC	.....	.....	No	No	WG‡	1¼	140	90	(d)	(c)	2.43	1.53	3.16	Y	HI	HI	HI	Y	2	140	90	Mec	2	Rb	GG	RS	.....	41
42	Plymouth-Roadking....P-9	.....	3	SC	RL	Cab	No	No	No	No	No	No	3.90	No	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	.....	.....	.....	2	BT	.....	.....	.....	42
43	Plymouth-DeLuxe....P-10	.....	3	SC	RL	Cab	No	No	No	No	No	No	4.10	No	2.57	1.55	3.48	Y	HI	HI	HI	Y	2¾	.....	.....	.....	2	BT	.....	.....	.....	43
44	Pontiac-Special 6....40-25	Own	3	SC	RL	RL	No	No	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	HI	HI	HI	Y	1¾	90EP	90EP	Mec	2	Rb	PL	RS	RS	44
45	Pontiac-DeLuxe 6....40-26	Own	3	SC	RL	RL	No	No	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	HI	HI	HI	Y	1¾	90EP	90EP	Mec	2	Rb	PL	RS	RS	45
46	Pontiac-DeLuxe 8....40-28	Own	3	SC	RL	RL	No	No	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	HI	HI	HI	Y	1¾	90EP	90EP	Mec	2	Rb	PL	RS	RS	46
47	Pontiac-Torpedo 8....40-29	Own	3	SC	RL	RL	No	No	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	HI	HI	HI	Y	1¾	90EP	90EP	Mec	2	Rb	PL	RS	RS	47
48	Studebaker-Champion 6....2G	WG	3	SC	RL	RL	No	No	WG‡	27*	90M	90M	4.56	.722‡	2.67	1.56	3.55	Y	HI	Sp	Sp	Y	18*	90M	90M	Spi	2	Met	PL	RS	RS	48
49	Studebaker-Commander 6....10A	WG	3	SC	RL	RL	No	No	WG	¾	70	50	4.55	.722	2.57	1.55	3.48	Y	HI	HI	HI	Y	2	70	40	Spi	2	Met	PL	RS	RS	49
50	Studebaker-President 8....6C	WG	3	SC	RL	RL	No	No	WG	¾	70	50	4.55	.722	2.57	1.55	3.48	Y	HI	HI	HI	Y	2	70	40	Spi	2	Met	PL	RS	RS	50
51	Willys....440	WG	3	(f)	.....	.....	No	No	No	No	No	No	(e)	No	2.67	1.56	3.55	Y	HI	Sp	Sp	Y	1	90	90	UP	2	Met	FG	RS	RS	51

ABBREVIATIONS:

*—Ounces
†—Equipped with fluid coupling
‡—At extra cost
90M—SAE 90 mineral base oil
(a)—Front shaft one, rear shaft two joints
(b)—Three plus two in overdrive
(c)—.755 on 1803–6; .770 on 1804–7; .752 on 1805–8
(d)—3.92 on 1803–6; 4.09 on 1804–7; 4.36 on 1805–8
(e)—4.30 on Speedway; 4.55 on DeLuxe
(f)—Lever from floor on Speedway; steering column on DeLuxe
BT—Ball and Trunnion type with roller bearings
Cab—By Cable
CT—Cross Type with roller bearings
DL—Dog on Hand Lever
FF—From Floor
FG—Fibre Grease
GG—Gun Grease
G-S—General Motors or Spicer
HI—Helical
Hy—Hydraulic
Mec—Mechanics Universal Joints Co.
Met—Metal with anti-friction bearings
Mp—Metal with plain bearing
Nb—Needle bearing
No—No, none or not
PL—Permanent Lubrication
Rb—Roller bearing type
RL—Rod Linkage
RR—Radius Rods
RS—Rear Springs
SA—Stabilizing Arms
Sb—Steel bushing
SC—Steering Column
Sp—Spur
Spi—Spicer Mfg. Co.
Ssg—Soda soap grease
St—Swivel type torque tube
TL—Transmission Lubricant
TT—Torque Tube
UP—Universal Products Co.
Y—Yes
WG—Warner Gear Division
Note:—A hydraulic automatic transmission with first gear ratio, 3.658 to 1; second, 2.53; third, 1.44; fourth, 1 to 1; reverse, 4.30; using constant mesh planetary gears. Optional at extra cost on Sixes and Eight models.

SPECIFICATIONS

Rear Axles, Tires, Wheels

Line Numbers	PASSENGER CAR MAKE AND MODEL	REAR AXLE: Make	Type	Min. Road Clearance	LUBRICATION: Capacity (Pts.)	Grade: Summer	Grade: Winter	GEARING: Type	Ratios: Standard	Ratios: Optional	No. of Teeth: Ring	No. of Teeth: Pinion	Pinion Adjustment	Pinion Bearing Adjustment	Pinion Bearing in Sleeve	Back Lash (Average)	Pinion Bearing—Preloaded	Differential Bearings—Preloaded	TIRES: Make	Size	Number of Plies	Inflation Pressure (Lbs.): Front	Inflation Pressure (Lbs.): Rear	RIM: Diameter (In.)	RIM: Width (In.)	WHEELS: Type	WHEELS: Make	Line Numbers
1	Bantam 65	Spi	½F	7½	1¼	160	90	SB	5.25	No	42	8	Shim	Shim	No	.007			Firestone	4.00/15	4	24	24	15	3.00	Disc	MW	1
2	Buick-Special 40-40	Own	½F	7 11/16	3	90Hyp	90Hyp	Hyp	4.40	3.91	44	10	Shim	No	No	.009	Yes	Yes	US, Fir, Gd	6.50/16	4	25	30	16	5.00	Disc	MW	2
3	Buick-Super 40-50	Own	½F	7 11/16	3	90Hyp	90Hyp	Hyp	4.40	No	44	10	Shim	No	No	.009	Yes	Yes	US, Fir, Gd	6.50/16	4	25	30	16	5.00	Disc	MW	3
4	Buick-Century 40-60	Own	½F	7¾	3	90Hyp	90Hyp	Hyp	3.90	3.61	39	10	Shim	No	No	.009	Yes	Yes	US, Fir, Gd	7.00/15	4	25	30	15	5.00	Disc	MW	4
5	Buick-Roadmaster 40-70	Own	½F	7¾	3	90Hyp	90Hyp	Hyp	3.90	No	39	10	Shim	No	No	.009	Yes	Yes	US, Fir, Gd	7.00/15	4	25	30	15	5.00	Disc	MW	5
6	Buick-Limited 40-80	Own	½F	8 1/32	4	90Hyp	90Hyp	Hyp	4.18	No	46	11	Shim	No	No	.009	Yes	Yes	Various	7.50/16	4	25	30	16	5.00	Disc	MW	6
7	Buick-Limited 40-90	Own	½F	8 3/32	4	90Hyp	90Hyp	Hyp	4.55	No	41	9	Shim	No	No	.009	Yes	Yes	Various	7.50/16	6	25	30	16	5.00	Disc	MW	7
8	Cadillac-V8 40-60S	Own	½F	8¼	5	90Hyp	90Hyp	Hyp	3.92	No	47	12	No	No	No	.007	Yes	Yes	US, Fir	7.00/16	6			16	4.50	Disc	KH	8
9	Cadillac-V8 40-62	Own	½F	8¼	5	90Hyp	90Hyp	Hyp	3.92	No	47	12	No	No	No	.007	Yes	Yes	US, Fir	7.00/16	6			16	4.50	Disc	KH	9
10	Cadillac-V8 40-72	Own	½F	8	6½	90Hyp	90Hyp	Hyp	4.31	No	56	13	No	No	No	.007	Yes	Yes	US, Fir	7.50/16	6			16	5.00	Disc	KH	10
11	Cadillac-V8 40-75	Own	½F	8	6½	90Hyp	90Hyp	Hyp	4.58	No	55	12	No	No	No	.007	Yes	Yes	US, Fir	7.50/16	6			16	5.00	Disc	KH	11
12	Cadillac-V16 40-90	Own	½F	8	6½	90Hyp	90Hyp	Hyp	4.31	No	56	13	No	No	No	.007	Yes	Yes	US, Fir	7.50/16	6	32	32	16	5.00	Disc	KH	12
13	Chevrolet-Master 85	Own	½F	7 7/8	3½	90Hyp	90Hyp	Hyp	3.73	No	41	11	Shim	No	No	.006	Yes	No	Various	6.00/16	4	26	28	16	4.00	Disc	Own	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	Own	½F	7 7/8	3½	90Hyp	90Hyp	Hyp	4.11	No	37	9	Shim	No	No	.006	Yes	No	Various	6.00/16	4	26	28	16	4.00	Disc	Own	14
15	Chrysler-Windsor & Royal C-25	.....	½F	8¾	3¼	90Hyp	90Hyp	Hyp	3.90	No	39	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.25/16	4	28	28	16	4.25	Disc	.....	15
16	Chrysler-Saratoga & N. Y. C-26	.....	½F	8¾	3¼	90Hyp	90Hyp	Hyp	3.91	No	43	11	Shim	Shim	No	.008	Yes	Yes	Goodyear	7.00/15	4	28	28	15	5.00	Disc	.....	16
17	Chrysler-Crown Imperial C-27	.....	½F	8 13/16	4½	90Hyp	90Hyp	Hyp	4.55	No	41	9	No	Shim		.008	Yes	Yes	Goodyear	7.50/15	4	28	28	15	5.00	Disc	.....	17
18	Crosley A	Spi	½F	6¾	1	90	90	SB	5.14	5.57	36	7	Shim	Shim	Yes	.006	Yes	Yes	Goodrich	4.25/12	4	24	24	12	2.50	Disc	MW	18
19	DeSoto-Custom S-7	.....	½F	8 5/8	3¼	90Hyp	90Hyp	Hyp	4.10	No	41	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.00/16	4	28	28	16	4.25	Disc	.....	19
20	Dodge D-14-17	.....	½F	8 5/8	3¼	90Hyp	90Hyp	Hyp	4.10	No	41	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.00/16	4	28	28	16	4.00	Disc	.....	20
21	Ford V8-60	Own	¾F	8	2½	160EP	110EP	SB	4.44	.....	40	9	No	Nut	No	.010	.....	.....	.....	5 50/16	4	30	30	16	3.50	Disc	.....	21
22	Ford V8-85	Own	¾F	8 1/16	2½	160EP	110EP	SB	3.78	.....	34	9	No	Nut	No	.010	.....	.....	.....	6.00/16	4	30	30	16	4.00	Disc	.....	22
23	Graham-DeL. & Custom 108	Spi	½F	7½	3	90Hyp	90Hyp	Hyp	4.27	4.55	47	11	Shim	Shim	No	.006	Yes	Yes	US	6.00/16	4	28	28	16	4.25	Disc	MW	23
24	Graham-Sch. & Cus. Sch. 107	Spi	½F	7½	3	90Hyp	90Hyp	Hyp	4.27	4.55	47	11	Shim	Shim	No	.006	Yes	Yes	US	6.25/16	4	28	28	16	4.25	Disc	MW	24
25	Hudson-Six 40	Own	½F	8 3/8	2¾	90EP	90EP	SB	4.55	4.11	41	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	6.00/16	4	26	30	16	4.50	Disc	MW	25
26	Hudson-Super & C. C. Six 41-43	Own	½F	(a)	2¾	90EP	90EP	SB	4.11	4.55	37	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	(b)	4	26	30	16	4.50	Disc	MW	26
27	Hudson-Eight & C. C. Eight 44-47	Own	½F	8 7/16	2¾	90EP	90EP	SB	4.11	4.55	37	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	(c)	4	26	30	16	(d)	Disc	MW	27
28	La Salle 40-50, 40-52	Own	½F	8¼	5	90Hyp	90Hyp	Hyp	3.92	No	47	12	No	No	No	.007	Yes	Yes	US, Fir	7.00/16	4	24	24	16	4.50	Disc	KH	28
29	Lincoln V12	Own	FF	.....	6	160EP	160EP	SB	4.58	.....	55	12	No	.....	No	.010	.....	.....	.....	7.50/17	6	40	40	17	.....	Disc	.....	29
30	Lincoln-Zephyr V12	Own	¾F	.....	4	90Hyp	90Hyp	Hyp	4.44	.....	40	9	No	Shim	No	.006	.....	.....	.....	7.00/16	4	28	28	16	4.00	Disc	.....	30
31	Mercury V8-95	Own	¾F	8 1/8	2½	160EP	160EP	SB	3.54	.....			No	Shim	No	.010	.....	.....	.....	6.00/16	4	30	30	16	4.00	Disc	.....	31
32	Nash-LaFayette 4010	Own	½F	7⅝	4	90Hyp	90Hyp	Hyp	4.10	4.45	41	10	Shim	Shim	No	.....	No	No	Goodyear	6.00/16	4	28	28	16	4.25	Disc	MW	32
33	Nash-Ambassador 6 4020	Own	½F	8	4	90Hyp	90Hyp	Hyp	4.10	4.45	41	10	Shim	Shim	No	.....	No	No	Goodyear	6.25/16	4	27	27	16	4.50	Disc	MW	33
34	Nash-Ambassador 8 4080	Own	½F	8	5	90Hyp	90Hyp	Hyp	4.10	4.45	41	10	Shim	Shim	No	.....	No	No	Goodyear	7.00/15	4	26	26	15	5.00	Disc	MW	34
35	Oldsmobile-Six 60	Own	½F	7 13/16	2½	.....	.....	Hyp	4.10	4.55	41	10	Shim	No	No	.005	Yes	Yes	Various	6.00/16	4	27	27	16	4.50	Disc	Var	35
36	Oldsmobile-Six 70	Own	½F	8 1/16	2½	.....	.....	Hyp	4.30	4.55	43	10	Shim	No	No	.005	Yes	Yes	Various	6.50/16	4	25	25	16	4.50	Disc	Var	36
37	Oldsmobile-Custom 8 Cruiser	Own	½F	8 1/16	2½	.....	.....	Hyp	3.63*	No			Shim	No	No	.006	Yes	Yes	Various	7.00/15	4	25	25	15	4.50	Disc	Var	37
38	Packard-One Ten 1800	Own	½F	.....	4½	90Hyp	90Hyp	Hyp	4.30	.....	43	10	.....	.....	.....	.004	.....	.....	.....	6.25/16	4	26	28	.....	.....	Disc	MW	38
39	Packard-One Twenty 1801	Own	½F	.....	6	90Hyp	90Hyp	Hyp	4.09	.....	45	11	.....	.....	.....	.004	.....	.....	.....	6.50/16	4	24	26	.....	.....	Disc	MW	39
40	Packard-Super Eight 1803-4-5	Own	½F	.....	6	90Hyp	90Hyp	Hyp	(e)	.....	(e)	(e)	.....	.....	.....	.004	.....	.....	.....	7.00/16	4	(g)	(g)	.....	.....	Disc	MW	40
41	Packard-Cus. Sup. Eight 1806-7-8	Own	½F	.....	6	90Hyp	90Hyp	Hyp	(e)	.....	(e)	(e)	.....	.....	.....	.004	.....	.....	.....	7.00/16	6	(g)	(g)	.....	.....	Disc	MW	41
42	Plymouth-Roadking P-9	.....	½F	8⅛	3¼	90Hyp	90Hyp	Hyp	3.90	No	39	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	5.50/16	4	32	32	16	4.00	Disc	.....	42
43	Plymouth-DeLuxe P-10	.....	½F	8⅝	3¼	90Hyp	90Hyp	Hyp	4.10	No	41	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6 00/16	4	28	28	16	4.00	Disc	.....	43
44	Pontiac-Special 6 40-25	Own	½F	8	3	90Hyp	90Hyp	Hyp	4.30	(h)	43	10	Shim	Shim	No	.005	Yes	Yes	US, Fir, Gr	6.00/16	4	26	28	16	4.50	Disc	KM	44
45	Pontiac-DeLuxe 6 40-26	Own	½F	8	3	90Hyp	90Hyp	Hyp	4.30	(h)	43	10	Shim	Shim	No	.005	Yes	Yes	US, Fir, Gr	6.00/16	4	26	28	16	4.50	Disc	KM	45
46	Pontiac-DeLuxe 8 40-28	Own	½F	8⅜	3	90Hyp	90Hyp	Hyp	4.30	(h)	43	10	Shim	Shim	No	.005	Yes	Yes	US, Fir, Gr	6.50/16	4	23	25	16	4.50	Disc	KM	46
47	Pontiac-Torpedo 8 40-29	Own	½F	8⅜	3	90Hyp	90Hyp	Hyp	4.30	(h)	43	10	Shim	Shim	No	.005	Yes	Yes	US, Fir, Gr	6.50/16	4	28	28	16	4.50	Disc	KM	47
48	Studebaker-Champion 6 2G	Spi	½F	8	2½	Elco28	Elco28	Hyp	4.56	4.10	41	9	Shim	Shim	No	.004	Yes	Yes	Firestone	5.50/16	4	26	26	16	4.00	Disc	Bd	48
49	Studebaker-Commander 6 10A	Spi	½F	7⅞	3	Special		Hyp	4.55	4.82	50	11	Shim	Shim	No	.004	Yes	Yes	Firestone	6.25/16	4	30	30	16	4.50	Disc	Bd	49
50	Studebaker-President 8 6C	Spi	½F	8	3	Special		Hyp	4.55	4.82	50	11	Shim	Shim	No	.005	Yes	Yes	Firestone	6.50/16	4	30	30	16	4.50	Disc	Bd	50
51	Willys 440	Own	½F	8	1½	90	90	SB	(l)	No	(m)	(m)	Shim	Shim	No	.006	Yes	Yes	Sig, Gd	(n)	4	28	28	16	3.50	Disc	KH	51

ABBREVIATIONS:

*—With Hydra-matic drive
½F—Semi-floating
¾F—Three-quarter floating
(a)—8⅜ on Super Six; 8⅝ on C.C. 6
(b)—6.00/16 on Super Six; 6.25/16 on C.C. 6
(c)—6.00/16 on Eight; 6.50/16 on C.C. 8
(d)—4.50 on Eight; 5.00 on C.C. 8
(e)—1803-1806—ratio of 3.92 with 47-12 teeth
1804-1807—ratio of 4.09 with 45-11 teeth
1805-1808—ratio of 4.36 with 48-11 teeth
f)—1803-6—4 ply, others 6 ply
(g)—1803-6—26 lb. front, 28 lb. rear
1804-7—27 lb. front, 29 lb. rear
1805-8—28 lb. front, 32 lb. rear
(h)—Plains 4.10, Mountain 4.55, Economy 3.90
(l)—De Luxe 4.55, Speedway 4.30
(m)—De Luxe 41-9, Speedway 43-10
(n)—De Luxe 5.50/16, Speedway 5.00/16
Bd—Budd Wheel Co.
FF—Full Floating
Fir—Firestone
Gr—Goodrich
Gd—Goodyear
Hyp—Hypoid
KH—Kelsey-Hayes
KM—Kelsey Hayes and Motor Whee
MW—Motor Wheel Co.
No—No or None
SB—Spiral Bevel
Sig—Seiberling
Spi—Spicer Mfg. Co.

Springs and Shock Absorbers

Line Numbers	PASSENGER CAR MAKE AND MODEL	SPRINGS — FRONT — Suspension	Type	Make	Material	Sway Eliminators	LEAF — Length (In.)	Width (In.)	No. of Leaves	Radius Rods	Shackled	Anti-shock Shackle Location	COIL — Free Length (In.)	Length Under Curb Weight	Rate (Lb. per In.)	SPRINGS — REAR — Suspension	Type	Make	Material	Sway Eliminators	LEAF — Length (In.)	Width (In.)	No. of Leaves	Cover Make	Shackles — Type	Shackles — Make	COIL — Free Length (In.)	COIL — Length Under Curb Weight (In.)	Rate (Lb. per In.)	SHOCK ABSORBERS — Make	Type	Fluid Capacity — Front	Fluid Capacity — Rear	Line Numbers
1	Bantam....65	Con	Tra	Bur		None	29¼	1½		Y		No				Con	½E	Bur		None	42½	1½	6	None	Link	Own			105	Mon	1W	50cc	50cc	1
2	Buick-Special....40-40	Ind	Coil	Own	9260	Tor							14½	9½	96	CS	Coil	Own	9260	Tor							18¼	10	134	DL	Hd			2
3	Buick-Super....40-50	Ind	Coil	Own	9260	Tor							14¾	9½	99	CS	Coil	Own	9260	Tor							18¼	10	134	DL	Hd			3
4	Buick-Century....40-60	Ind	Coil	Own	9260	Tor							14⅝	9½	103	CS	Coil	Own	9260	Tor							18¼	10	145	DL	Hd			4
5	Buick-Roadmaster....40-70	Ind	Coil	Own	9260	Tor							14¾	9½	106	CS	Coil	Own	9260	Tor							18¼	10	145	DL	Hd			5
6	Buick-Limited....40-80	Ind	Coil	Own	9260	Tor							14⅞	10 1/16	119	CS	Coil	Own	9260	None							20¼	10⅞	147	DL	Hd			6
7	Buick-Limited....40-90	Ind	Coil	Own	9260	Tor							14⅞	10 1/16	127	CS	Coil	Own	9260	None							19⅞	10⅞	158	DL	Hd			7
8	Cadillac-V8....40-60S	Ind	Hel	Eat	9260	Tor										Con	½E	Eat	9260	Crl	54½	2	9		CU	PM				DL	Hd	.042g	.041g	8
9	Cadillac-V8....40-62	Ind	Hel	Eat	9260	Tor										Con	½E	Eat	9260	Crl	54½	2	8		CL	TP				DL	Hd	.042g	.041g	9
10	Cadillac-V8....40-72	Ind	Hel	Eat	9260	Tor										Con	½E	Eat	9260	Crl	56½	2	10		CL	TP				DL	Hd	.042g	.041g	10
11	Cadillac-V8....40-75	Ind	Hel	Eat	9260	Tor										Con	½E	Eat	9260	Crl	62	2¼	10		CL	TP				DL	Hd	.084g	.053g	11
12	Cadillac-V16....40-90	Ind	Hel	Eat	9260	Tor										Con	½E	Eat	9260	Crl	62	2¼	10		RT	TP				DL	Hd	.084g	.053g	12
13	Chevrolet-Master....85	Con	½E	Own	ChS	Tor	36	1¾	8	N	F	No			175	Con	½E	Own	ChS	None	49	1¾	8	None	Th	Own			120	DL	(d)			13
14	Chevrolet-Spec. DeL. & Mas. DeL.	Ind	Coil	Own	SMS	Tor							13⅛	10	300	Con	½E	Own	ChS	None	49	1¾	8	Yes	Th	Own			120	DL	Hd			14
15	Chrysler-Windsor & Royal...C-25	Ind	Coil	Det	Amola	Yes								8¾		Con	½E	Det	Amola		53⅝	1¾	9	Yes	SU	PM					Hd			15
16	Chrysler-Saratoga & N. Y....C-26	Ind	Coil	Det	Amola	Yes								9¾		Con	½E	Det	Amola		53⅝	1¾	11	Yes	SU	PM					Hd			16
17	Chrysler-Crown Imperial....C-27	Ind	Coil	Det	Amola	Yes								9¾		Con	½E	Det	Amola		53⅝	2	11	Yes	SU	PM					Hd			17
18	Crosley....A	Con	½E	Mat	SMS	None	27	1½	5	No	F	No				Con	¼E	Mat	SMS	None	21 7/16	1½	6	None	RM	Own				DL	Tw	3.04oz	3.04oz	18
19	DeSoto-Custom....S-7	Ind	Coil	Det	Amola	Yes								8¾		Con	½E	Det	Amola		53⅝	1¾	9	Yes	SS						Hd			19
20	Dodge....D-14-17	Ind	Coil	Det	Amola	(e)								8¾		Con	½E	Det	Amola		53⅝	1¾	9	Yes	SU	PM					Hd			20
21	Ford....V8-60	Con	Tra	Own			41.8	2	11	Y					255	Con	Tra	Own			46½	2¼	11								Hd			21
22	Ford....V8-85	Con	Tra	Own		Tor	43¾	2	10	Y					255	Con	Tra	Own			46½	2¼	10	Yes							Hd			22
23	Graham-DeL. & Custom....108	Con	½E	Det	Amola	Tor	40½	1¾	11	N	F	RL				Con	½E	Det	Amola	None	53	1¾	9	FLJ	Ru	Har				DL	Hd	150cc	150cc	23
24	Graham-Sch. & Cus. Sch....107	Con	½E	Det	Amola	Tor	40½	1¾	11	N	F	RL				Con	½E	Det	Amola	None	53	1¾	9	FLJ	Ru	Har				DL	Hd	150cc	150cc	24
25	Hudson-Six....40	Ind	Coil	Eat	9260	Tor							14⅞	9 11/16	80	Con	½E	EMS	Amola	Lat	60	1¾	8	Yes	SU	PM				Mon	Tw	3¾oz	6¼oz	25
26	Hudson-Super & C. C. Six..41-43	Ind	Coil	Eat	9260	Tor							14⅞	9 11/16	80*	Con	½E	EMS	Amola	Lat	60	1¾	8	Yes	SU	PM			100*	Mon	Tw	3¾oz	6¼oz	26
27	Hudson-Eight & C. C. Eight 44-47	Ind	Coil	Eat	9260	Tor							15 1/16	9 11/16	90	Con	½E	EMS	Amola	Lat	60	1¾	8	Own	SU	PM			100‡	DL	Tw	3¾oz	6¼oz	27
28	La Salle....40-50, 40-52	Ind	Hel	Eat	9260	Tor										Con	½E	Eat	9260	Crl	54½	2	8		CL	TP				DL	Hd	.042g	.041g	28
29	Lincoln....V12	Con	½E	Own			42	2¼								Con	½E	Own			62	2½									Hd			29
30	Lincoln-Zephyr....V12	Con	Tra	Own			42½	2		Y					315	Con	Tra	Own			46½	2¼	14						250		Hd			30
31	Mercury....V8-95	Con	Tra	Own			43¾	2	10	Y					255	Con	Tra	Own			46½	2¼	11	Yes							Hd			31
32	Nash-LaFayette....4010	Ind	Coil	Eat	SMS	Tor							13⅛	9	385	Con	½E	StS	SMS	None	54	1¾	8	StS	SU	PM				DL	Tw			32
33	Nash-Ambassador 6....4020	Ind	Coil	Eat	SMS	Tor							13⅛	9	385	Con	½E	StS	SMS	None	54	1¾	8	StS	SU	PM				DL	Tw			33
34	Nash-Ambassador 8....4080	Ind	Coil	Eat	SMS	Tor							13⅞	9	367	Con	½E	StS		None	54	1¾	10	StS	SU	PM				DL	Tw			34
35	Oldsmobile-Six....60	Ind	Coil	Own	SMS	Tor							20 1/16	10 1/16	290	Con	Coil	Own	SMS	Lat							20 1/16	15 1/16	87	DL	Hd			35
36	Oldsmobile-Six....70	Ind	Coil	Own	SMS	Tor							14 3/32		290	Con	Coil	Own	SMS	Lat							21 3/32	9 1/16	97	DL	Hd			36
37	Oldsmobile-Custom 8 Cruiser....	Ind	Coil	Own	SMS	Tor							14 5/16		325	Con	Coil	Own	SMS	Lat							21 3/32	9 1/16	97	DL	Hd			37
38	Packard-One Ten....1800	Ind	Coil		SMS										69	Con	½E		SMS		54⅝	2		None	RB				105	(b)	(b)			38
39	Packard-One Twenty....1801	Ind	Coil		SMS										74	Con	½E		SMS		54⅝	2		None	RB				110	(b)	(b)			39
40	Packard-Super Eight....1803-4-5	Ind	Coil		SMS										(a)	Con	½E		SMS		54⅝	2		None	RB				115	(b)	(b)			40
41	Packard-Cus. Sup. Eight.1806-7-8	Ind	Coil		SMS										(a)	Con	½E		SMS		54⅝	2		None	RB				115	(b)	(b)			41
42	Plymouth-Roadking....P-9	Ind	Coil	Det	Amola	None								8¾		Con	½E	Det	Amola		53⅝	1¾	7	†	SU	PM					Hd			42
43	Plymouth-DeLuxe....P-10	Ind	Coil	Det	Amola	Yes								8¾		Con	½E	Det	Amola		53⅝	1¾	9	Yes	SU	PM					Hd			43
44	Pontiac-Special 6....40-25	Ind	Coil	Own	9260	Tor							14⅞	9½	275	Con	½E		SMS	None	52	2	8	Yes	Th	Own				DL	Hd	125cc	6¾	44
45	Pontiac-DeLuxe 6....40-26	Ind	Coil	Own	9260	Tor							14 3/32	9½	290	Con	½E		SMS	None	52	2	8	Yes	Th	Own				DL	Hd	125cc	6¾	45
46	Pontiac-DeLuxe 8....40-28	Ind	Coil	Own	9260	Tor							14 7/16	9½	325	Con	½E		SMS	None	52	2	8	Yes	Th	Own				DL	Hd	125cc	6¾	46
47	Pontiac-Torpedo 8....40-29	Ind	Coil	Own	9260	Tor							15 3/32	9½	290	Con	½E		SMS	None	52	2	8	Yes	Th	Own				DL	Hd	125cc	6¾	47
48	Studebaker-Champion 6....2G	Ind	Trs	Own	SMS	None	47½	2½	11							Con	½E	Own	SMS	None	46	1¾	6	And	Ru	Har				Hou	Tw	1.77oz	2.28oz	48
49	Studebaker-Commander 6....10A	Ind	Trs	Own	SMS	None	49½	2½	15	No						Con	½E	Own	SMS	None	54	1¾	10	And	Ru	Har				Hou	Tw			49
50	Studebaker-President 8....6C	Ind	Trs	Own	SMS	None	49½	2½	16	No						Con	½E	Own	SMS	None	54	1¾	10	And	Ru	Har				Hou	Tw			50
51	Willys....440	Con	½E	Mat	ChS	None	36¼	1¾	7	No	F	No				Con	½E	Mat	ChS	None	46	1¾	6	None	Ru	Mon				Mon	Tw	4¾oz	5½oz	51

ABBREVIATIONS:
*—Super Six only, C.C. model 90 lb. front, 110 lb. rear
†—At extra cost
‡—Country Club 8—110 lb.
¼E—One-quarter elliptic
½E—Semi-elliptic
1W—One Way

(a)—1750x77 for 1803-6; 1965x95 for 1804-7; 2125x110 rate for 1805-8
(b)—Delco hydraulic two way on front, Monroe or Delco, direct action on rear
(c)—14 1/16 on De Luxe 8, 15 3/32 on Torpedo 8
(d)—Two way on front, one way on rear
(e)—Sway eliminator standard on D14 none on D17
g—Gallons

And—Anderson
Bur—Burton Spring Co.
cc—Cubic centimeters
ChS—Chromium Steel
CL—Compression Link
Con—Conventional
Crl—Cross Link
CS—Coil Spring
Det—Detroit Steel Products
CU—Compression U
DL—Delco-Lovejoy
Eat—Eaton Manufacturing Div.
EMS—Eaton, Mather or Spring Perch
F—Front
FLJ—F. L. Jacobs
Har—Harris Products
Hd—Hydraulic, double acting
Hel—Helical
Hou—Houde
Ind—Independent
Lat—Lateral
Mat—Mather Mfg. Co.
Mon—Monroe
oz—Ounces
Par—Parallelogram
PM—Pressed Metals of America
RB—Rubber bushed
RL—Rear left
RM—Rubber mounting
Th—Threaded
Tor—Torsion Rod
TP—Trayer Products Co.
RT—Rubber and Threaded
Ru—Rubber
SMS—Silicon Manganese Steel
SS—Side Strap type
StS—Standard Steel Spring Co.
SU—Silent "U"
Trs—Transverse
Tw—Two way
Var—Various

Steering and Brakes

Line Number	PASSENGER CAR MAKE AND MODEL	STEERING: Gear Type	Gear Make	Gear Ratio (to 1)	Drag Link	No. of Tie Rods	Intermediate Arm	Car Turning Radius (Ft.) Right (Ft.)	Caster (Deg.)	Camber (Deg.)	Toe-in (In.)	Kingpin Inclination (Deg.)	FOOT BRAKE: Make	Type	Power Unit—Make	Type Lining	Drums: Material	Drums: Diameter	Lining: Length per Wheel (In.)	Lining: Width (In.)	Lining: Thickness (In.)	Clearance: Toe	Clearance: Heel	Total Foot Braking Area (Sq. In.)	Per Cent Braking on Rear Wheels	HAND BRAKE: Location of Lever	Operates on	Internal or External	Drum Diameter	Lining: Length per Drum	Lining: Width (In.)	Lining: Thickness (In.)	Clearance (In.)	Line Number
1	Bantam....65	CL	Ro	14	Lg	1	N	15	15	1° 15′	$\frac{1}{16}$–$\frac{1}{8}$	1° 30′	Own	M	No	Mo	St	8	13	$1\frac{1}{8}$	$\frac{11}{64}$	SC	SC	52	50	CR	4W	Int					.009	1
2	Buick-Special....40-40	WR	Sag	19	No	2	N	$20\frac{1}{2}$	$+\frac{3}{8}$–$\frac{3}{8}$	$N\frac{1}{4}$ to +1	0–$\frac{1}{16}$	$3\frac{1}{2}$ to $4\frac{1}{2}$	BD	H	No	WM	Ce	12	$22\frac{11}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.009	.009	158.7	47	UL	RS	Int	12	$22\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.009	2
3	Buick-Super....40-50	WR	Sag	19	No	2	N	$20\frac{1}{2}$	$+\frac{3}{8}$–$\frac{3}{8}$	$N\frac{1}{4}$ to +1	0–$\frac{1}{16}$	$3\frac{1}{2}$–$4\frac{1}{2}$	BD	H	No	WM	Ce	12	$22\frac{11}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.009	.009	158.7	47	UL	RS	Int	12	$22\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.009	3
4	Buick-Century....40-60	WR	Sag	19	No	2	N	$21\frac{3}{4}$	$+\frac{3}{8}$–$\frac{3}{8}$	$N\frac{1}{4}$ to +1	0–$\frac{1}{16}$	$3\frac{1}{2}$–$4\frac{1}{2}$	BD	H	No	WM	Ce	12	$22\frac{11}{16}$	$2\frac{1}{4}$	$\frac{1}{16}$	.009	.009	206.4	47	UL	RS	Int	12	$22\frac{1}{16}$	$2\frac{1}{4}$	$\frac{1}{16}$	.009	4
5	Buick-Roadmaster....40-70	WR	Sag	19	No	2	N	$21\frac{3}{4}$	$+\frac{3}{8}$–$\frac{3}{8}$	$N\frac{1}{4}$ to +1	0–$\frac{1}{16}$	$3\frac{1}{2}$–$4\frac{1}{2}$	BD	H	No	WM	Ce	12	$22\frac{11}{16}$	$2\frac{1}{4}$	$\frac{1}{16}$	.009	.009	206.4	47	UL	RS	Int	12	$22\frac{1}{16}$	$2\frac{1}{4}$	$\frac{1}{16}$	.009	5
6	Buick-Limited....40-80	WR	Sag	22	Lg	2	Y	.....	0–$\frac{3}{8}$	$N\frac{1}{4}$ to +1	0–$\frac{1}{16}$	4–5	BD	H	No	WM	Cl	14	$26\frac{11}{16}$	2	$\frac{1}{4}$	.009	.009	214.6	47	UL	RS	Int	14	$26\frac{1}{16}$	2	$\frac{1}{4}$	.009	6
7	Buick-Limited....40-90	WR	Sag	22	Lg	2	Y	.....	0–$\frac{3}{8}$	$N\frac{1}{4}$ to +1	0–$\frac{1}{16}$	4–5	BD	H	No	WM	Cl	14	$26\frac{11}{16}$	2	$\frac{1}{4}$	.009	.009	214.6	47	UL	RS	Int	14	$26\frac{1}{16}$	2	$\frac{1}{4}$	.009	7
8	Cadillac-V8....40-60S	WR	Sag	19	Rcs	2	N	.....	N1$\frac{3}{4}$–N2$\frac{3}{4}$	0 to $+\frac{3}{4}$	$\frac{1}{16}$–$\frac{1}{8}$	5° 8′	Ben	H	No	Mo	Ce	12	$24\frac{1}{2}$	(a)	$\frac{1}{16}$	.010	.010	208.0	45.5	UL	RS	Int	12	$24\frac{1}{2}$	2	$\frac{1}{16}$	.010	8
9	Cadillac-V8....40-62	WR	Sag	19	Rcs	2	N	.....	N1$\frac{3}{4}$–N2$\frac{3}{4}$	0 to $+\frac{3}{4}$	$\frac{1}{16}$–$\frac{1}{8}$	5° 8′	Ben	H	No	Mo	Ce	12	$24\frac{1}{2}$	(a)	$\frac{1}{16}$	.010	.010	208.0	45.5	UL	RS	Int	12	$24\frac{1}{2}$	2	$\frac{1}{16}$	.010	9
10	Cadillac-V8....40-72	RB	Sag	23.6	FA	2	N	.....	N1$\frac{3}{4}$–N2$\frac{3}{4}$	0 to $+\frac{3}{4}$	$\frac{1}{16}$–$\frac{1}{8}$	5° 8′	Ben	H	No	Mo	Ce	12	$24\frac{1}{2}$	(b)	$\frac{1}{16}$	.010	.010	233.0	45.5	UL	RS	Int	12	$24\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{16}$	.010	10
11	Cadillac-V8....40-75	WR	Sag	24	Rcs	2	Y	.....	$\frac{1}{2}$ to N1	0 to $+\frac{1}{2}$	$\frac{1}{32}$–$\frac{3}{32}$	5° 1′	Ben	H	No	Mo	Ce	14	$28\frac{11}{16}$	$2\frac{1}{4}$	$\frac{1}{4}$	.010	.010	258.0	43.4	UL	RS	Int	14	$28\frac{1}{16}$	$2\frac{1}{4}$	$\frac{1}{4}$	.010	11
12	Cadillac-V16....40-90	WR	Sag	24	FA	2	Y	23.4	N$\frac{1}{2}$ to N1	0 to $+\frac{1}{2}$	$\frac{1}{32}$–$\frac{3}{32}$	5° 1′	Ben	H	No	Mo	Ce	14	$28\frac{11}{16}$	$2\frac{1}{4}$	$\frac{1}{4}$	.010	.010	258.0	43.0	UL	RS	Int	14	$28\frac{1}{16}$	$2\frac{1}{4}$	$\frac{1}{4}$	.010	12
13	Chevrolet-Master....85	WR	Own	19	Lg	1	N	.....	$2\frac{1}{4}$–$\frac{1}{2}$	1–$\frac{1}{2}$	$\frac{1}{16}$–$\frac{1}{8}$	7° 10′	Own	H	No	Mo	Ce	11	$22\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	158.2	47.8	UL	RS	Int	11	$22\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	WR	Own	17.5	No	2	N	.....	0–$\frac{1}{2}$	$N\frac{1}{4}$–$\frac{1}{2}$	0–$\frac{1}{16}$	4° 45′	Own	H	No	Mo	Ce	11	$22\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	158.2	47.5	UL	RS	Int	11	$22\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	14
15	Chrysler-Windsor & Royal....C-25	WR	Gem	18.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0–$\frac{1}{8}$	$4\frac{3}{4}$–6	Loe	H	No	Mo	Ce	11	$19\frac{1}{16}$	2	$\frac{13}{64}$	.012	.006	155.5	40.0	UL	PS	Ext	6	$17\frac{1}{16}$	2	$\frac{13}{64}$	.017	15
16	Chrysler-Saratoga & N. Y....C-26	WR	Gem	20.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0–$\frac{1}{8}$	$4\frac{3}{4}$–6	Loe	H	No	Mo	Ce	12	(e)	2	$\frac{13}{64}$	*	*	189.2	39.0	UL	PS	Ext	7	$20\frac{1}{16}$	$2\frac{1}{2}$	$\frac{13}{64}$	.017	16
17	Chrysler-Crown Imperial....C-27	WR	Gem	20.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0–$\frac{1}{8}$	$4\frac{3}{4}$–6	Loe	H	VP	Mo	Ce	12	(e)	2	$\frac{13}{64}$	*	*	189.2	39.0	UL	PS	Ext	7	$20\frac{1}{16}$	$2\frac{1}{2}$	$\frac{13}{64}$	.017	17
18	Crosley....A	CL	Ro	17	Lg	1	N	15	6–11	2	$\frac{1}{16}$–$\frac{1}{8}$	$6\frac{1}{2}$	Haw	M	No	Wo	St	6	$18\frac{3}{16}$	1	$\frac{1}{16}$	one	piece	148.0	50.0	OF	4W	Int	6	$18\frac{3}{16}$	1	$\frac{1}{16}$	Df	18
19	DeSoto-Custom....S-7	WR	Gem	18.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0 to $\frac{1}{16}$	$4\frac{3}{4}$–6	Loe	H	No	Mo	Cl	11	$19\frac{1}{16}$	2	$\frac{13}{64}$	.012	.006	155.5	40.0	UL	PS	Ext	6	$17\frac{1}{16}$	2	$\frac{13}{64}$	.017	19
20	Dodge....D-14-17	WR	Gem	18.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0–$\frac{1}{8}$	$4\frac{3}{4}$–6	Loe	H	No	Mo	Cl	11	$19\frac{1}{16}$	2	$\frac{13}{64}$	.012	.006	155.5	40.0	UL	PS	Ext	6	$17\frac{1}{16}$	2	$\frac{13}{64}$	.017	20
21	Ford....V8-60	WR	Gem	18.2	Rcs	1	N	.....	$4\frac{1}{2}$–9	$\frac{1}{4}$–1	$\frac{1}{16}$–$\frac{1}{8}$	8	Loe	H	No	WM	Ce	12	.....	.....	.....	.....	.....	162.0	45.0	UL	RS	Int	12	.....	.....	.....	.....	21
22	Ford....V8-85	WR	Gem	18.2	Rcs	1	N	.....	$4\frac{1}{2}$–9	$\frac{1}{4}$–1	$\frac{1}{16}$–$\frac{1}{8}$	8	Loe	H	No	WM	Ce	12	.....	.....	.....	.....	.....	162.0	45.0	UL	RS	Int	12	.....	.....	.....	.....	22
23	Graham-DeL. & Custom....108	CL	Ro	15–17	Lg	1	N	.....	3–4	1	$\frac{1}{8}$	$7\frac{1}{2}$	Own	H	No	Mo	Ce	11	23	$1\frac{3}{4}$	$\frac{1}{4}$	.010	.006	161.0	50.0	UL	PS	Ext	6	$18\frac{1}{16}$	2	$\frac{1}{4}$	$\frac{1}{32}$	23
24	Graham-Sch. & Cus. Sch....107	CL	Ro	15–17	Lg	1	N	.....	3–4	1	$\frac{1}{8}$	$7\frac{1}{2}$	Own	H	No	Mo	Ce	11	23	$1\frac{3}{4}$	$\frac{1}{4}$	.010	.006	161.0	50.0	UL	PS	Ext	6	$18\frac{1}{16}$	2	$\frac{1}{4}$	$\frac{1}{32}$	24
25	Hudson-Six....40	WR	Gem	18.2	Lg	2	Y	20.5	0–$\frac{1}{4}$	$\frac{1}{2}$–$\frac{1}{4}$	$\frac{1}{32}$–$\frac{3}{32}$	3° 36′	Ben	DA	No	WM	AS	$9\frac{1}{16}$	19	$1\frac{3}{4}$	$\frac{1}{4}$	.010	.010	133.2	50.0	UL	RS	Int	$9\frac{1}{16}$	19	$1\frac{3}{4}$	$\frac{1}{16}$	.010	25
26	Hudson-Super & C. C. Six..41-43	WR	Gem	18.2	Lg	2	Y	21.5	0–$\frac{1}{4}$	$\frac{1}{2}$–$\frac{1}{4}$	$\frac{1}{32}$–$\frac{3}{32}$	3° 36′	Ben	DA	No	WM	AS	$10\frac{1}{16}$ (d)	$23\frac{1}{16}$ (e)	$1\frac{3}{4}$	$\frac{1}{4}$ (f)	.010	.010	154.9 (g)	50.0	UL	RS	Int	$10\frac{1}{16}$ (d)	$22\frac{1}{16}$ (e)	$1\frac{3}{4}$	$\frac{1}{16}$ (f)	.010	26
27	Hudson-Eight & C. C. Eight 44-47	WR	Gem	18.4	Lg	2	Y	20.7	0–$\frac{1}{4}$	$\frac{1}{2}$–$\frac{1}{4}$	$\frac{1}{32}$–$\frac{3}{32}$	3° 36′	Ben	DA	No	WM	AS	$11\frac{1}{16}$	$23\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{4}$	.010	.010	167.5	50.0	UL	RS	Int	$11\frac{1}{16}$	$23\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{4}$	.010	27
28	La Salle....40-50, 40-52	WR	Sag	19	Rcs	2	N	22	N1$\frac{3}{4}$–N2$\frac{3}{4}$	0 to $+\frac{3}{4}$	$\frac{1}{16}$–$\frac{1}{8}$	5° 6′	Ben	H	No	Mo	Ce	12	$24\frac{1}{2}$	2	$\frac{1}{4}$	.010	.010	233.0	45.5	UL	RS	Int	12	$24\frac{1}{2}$	2	$\frac{1}{16}$	.010	28
29	Lincoln....V12	.....	Gem	21.2	.....	1	N	.....	$1\frac{1}{2}$	1	$\frac{1}{16}$–$\frac{1}{8}$	$7\frac{1}{2}$	.....	M	Yes	WM	Ce	$15\frac{1}{8}$	$33\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{4}$	.....	.....	335.0	50.0	UL	4W	Int	$15\frac{1}{8}$	$33\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{4}$	.....	29
30	Lincoln-Zephyr....V12	WR	Gem	18.4	Rcs	1	N	22	4	$\frac{3}{4}$	$\frac{1}{16}$	4	Ben	H	No	WM	Ce	12	23.9	$1\frac{3}{4}$	.21	.....	.....	168.0	50.0	UL	RS	Int	12	23.9	$1\frac{3}{4}$	.21	.....	30
31	Mercury....V8-95	WR	Gem	18.2	Rcs	1	N	.....	$4\frac{1}{2}$–9	$\frac{1}{4}$–1	$\frac{1}{16}$–$\frac{1}{8}$	8	Loe	H	No	WM	Ce	12	.....	.....	.....	.....	.....	162.0	45.0	UL	RS	Int	12	.....	.....	.....	.....	31
32	Nash-LaFayette....4010	WR	Gem	18.2	Lg	2	N	18.5	0 to N$\frac{1}{2}$	$\frac{1}{4}$–$\frac{3}{4}$	$\frac{3}{32}$–$\frac{5}{32}$	$4\frac{1}{2}$	Ben	H	Ne	Mo	Cl	10	22	2	$\frac{1}{16}$	.010	.010	169.0	47.0	UL	RS	Int	10	22	2	$\frac{1}{16}$	.010	32
33	Nash-Ambassador 6....4020	WR	Gem	18.2	Tra	2	N	19.5	0 to N$\frac{1}{2}$	$\frac{1}{4}$–$\frac{3}{4}$	$\frac{3}{32}$–$\frac{5}{32}$	$4\frac{1}{2}$	Ben	H	No	Mo	Cl	10	22	2	$\frac{1}{16}$	.010	.010	169.0	47.0	UL	RS	Int	10	22	2	$\frac{1}{16}$	.010	33
34	Nash-Ambassador 8....4080	WR	Gem	20.2	Tra	2	N	20	0 to N$\frac{1}{2}$	$\frac{1}{4}$–$\frac{3}{4}$	$\frac{3}{32}$–$\frac{5}{32}$	$4\frac{1}{2}$	Ben	H	No	Mo	Cl	$11\frac{1}{16}$	24	$2\frac{1}{4}$	$\frac{1}{16}$	.010	.010	216.0	47.0	UL	RS	Int	$11\frac{1}{16}$	24	$2\frac{1}{4}$	$\frac{1}{16}$	.010	34
35	Oldsmobile-Six....60	WR	Sag	19	Tra	2	N	18	0 to N$\frac{3}{4}$	N$\frac{1}{4}$ to $+\frac{1}{2}$	$\frac{1}{16}$–$\frac{1}{8}$	4° 51′ 10″	.....	H	No	Mo	Cl	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	.010	148.0	45.0	UL	RS	Int	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	35
36	Oldsmobile-Six....70	WR	Sag	19	Tra	2	N	18.6	0 to N$\frac{3}{4}$	N$\frac{1}{4}$ to $+\frac{1}{2}$	$\frac{1}{16}$–$\frac{1}{8}$	4° 51′ 10″	.....	H	No	Mo	Cl	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	.010	148.0	45.0	UL	RS	Int	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	36
37	Oldsmobile-Custom 8 Cruiser....	WR	Sag	10	Tra	2	N	19	0 to N$\frac{3}{4}$	N$\frac{1}{4}$ to $+\frac{1}{2}$	$\frac{1}{16}$–$\frac{1}{8}$	4° 51′ 10″	.....	H	No	WM	Cl	11	$21\frac{1}{16}$	2	$\frac{1}{16}$	.010	.010	170.5	45.0	UL	RS	Int	11	$21\frac{1}{16}$	2	$\frac{1}{16}$	.010	37
38	Packard-One Ten....1806	WR	Own	20.2	.....	.....	.....	21	$1\frac{1}{2}$–$\frac{1}{2}$	$\frac{1}{2}$–$\frac{3}{4}$–0	0+$\frac{1}{16}$–0	1° 54′	.....	H	No	.....	Ce	11	$22\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	158.5	.....	UL	RS	Int	11	$22\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	38
39	Packard-One Twenty....1801	WR	Own	20.2	.....	.....	.....	21.5	$1\frac{1}{2}$–$\frac{1}{2}$	$\frac{1}{2}$–$\frac{3}{4}$–0	0+$\frac{1}{16}$–0	1° 54′	.....	H	No	.....	Ce	12	$24\frac{1}{2}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	171.5	.....	UL	RS	Int	12	$24\frac{1}{2}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	39
40	Packard-Super Eight....1803-4-5	WR	Own	20.2	.....	.....	.....	(h)	$1\frac{1}{2}$–$\frac{1}{2}$	$\frac{1}{2}$–$\frac{3}{4}$–0	0+$\frac{1}{16}$–0	1° 54′	.....	H	No	.....	Ce	12	(l)	(m)	$\frac{1}{16}$	.....	.....	(k)	.....	UL	RS	Int	12	(l)	(m)	$\frac{1}{16}$	.....	40
41	Packard-Cus. Sup. Eight.1806-7-8	WR	Own	20.2	.....	.....	.....	(h)	$1\frac{1}{2}$–$\frac{1}{2}$	$\frac{1}{2}$–$\frac{3}{4}$–0	0+$\frac{1}{16}$–0	1° 54′	.....	H	No	.....	Ce	12	(l)	(m)	$\frac{1}{16}$	.....	.....	(k)	.....	UL	RS	Int	12	(l)	(m)	$\frac{1}{16}$	.....	41
42	Plymouth-Roadking....P-9	WR	Gem	18.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0–$\frac{1}{16}$	$4\frac{3}{4}$–6	Loe	H	No	Mo	Ce	10	18	2	$\frac{13}{64}$	.012	.006	144.0	45.0	UL	PS	Ext	6	$17\frac{1}{16}$	2	$\frac{13}{64}$	.017	42
43	Plymouth-DeLuxe....P-10	WR	Gem	18.2	.....	2	.....	.....	N1 to +1	0 to $+\frac{3}{4}$	0–$\frac{1}{16}$	$4\frac{3}{4}$–6	Loe	H	No	Mo	Ce	10	18	2	$\frac{13}{64}$	.012	.006	144.0	45.0	UL	PS	Ext	6	$17\frac{1}{16}$	2	$\frac{13}{64}$	.017	43
44	Pontiac-Special 6....40-25	WR	Sag	19	Tra	2	N	$37\frac{1}{2}$	N$\frac{1}{2}$ to N1	$\frac{1}{16}$–$\frac{5}{8}$	0–$\frac{1}{16}$	4° 51′	Ben	H	No	Mo	CN	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	149.0	47.0	UL	RS	Int	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	44
45	Pontiac-DeLuxe 6....40-26	WR	Sag	19	Tra	2	N	$38\frac{1}{2}$	N$\frac{1}{2}$ to N1	$\frac{1}{16}$–$\frac{5}{8}$	0–$\frac{1}{16}$	4° 51′	Ben	H	No	Mo	CN	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	149.0	47.0	UL	RS	Int	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	45
46	Pontiac-DeLuxe 8....40-28	WR	Sag	19	Tra	2	N	$37\frac{3}{4}$	N$\frac{1}{2}$ to N1	$\frac{1}{16}$–$\frac{5}{8}$	0–$\frac{1}{16}$	4° 51′	Ben	H	No	Mo	CN	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	149.0	47.0	UL	RS	Int	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	46
47	Pontiac-Torpedo 8....40-29	WR	Sag	19	Tra	2	N	$38\frac{3}{4}$	N$\frac{1}{2}$ to N1	$\frac{1}{16}$–$\frac{5}{8}$	0–$\frac{1}{16}$	4° 51′	Ben	H	No	Mo	CN	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	.....	149.0	47.0	UL	RS	Int	11	$21\frac{1}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.....	47
48	Studebaker-Champion 6....2G	CL	Ro	14.2	Tra	3	Y	41	1–2	$\frac{1}{2}$	$\frac{1}{8}$–$\frac{3}{32}$	$5\frac{1}{2}$	Loc	H	No	WM	Ce	9	$17\frac{5}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	.005	124.0	43.0	UL	RS	Int	9	$17\frac{5}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	48
49	Studebaker-Commander 6....10A	CL	Ro	.....	Tra	3	Y	$41\frac{1}{4}$	N$\frac{1}{4}$ to $+\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$–$\frac{3}{32}$	$5\frac{1}{2}$	Loc	H	No	WM	Ce	11	$19\frac{11}{16}$	2	$\frac{1}{16}$	.010	.005	150.0	45.0	UL	RS	Int	11	$19\frac{11}{16}$	2	$\frac{1}{16}$	.010	49
50	Studebaker-President 8....6C	CL	Ro	.....	Tra	3	Y	$43\frac{1}{2}$	N$\frac{1}{4}$ to $+\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$–$\frac{3}{32}$	$5\frac{1}{2}$	Loc	H	No	WM	Ce	11	$19\frac{11}{16}$	$2\frac{1}{4}$	$\frac{1}{16}$	.010	.005	169.0	45.0	UL	RS	Int	11	$19\frac{11}{16}$	$2\frac{1}{4}$	$\frac{1}{16}$	.010	50
51	Willys....440	WR	Gem	16.4	Lg	1	N	17	3	2	$\frac{1}{16}$–$\frac{1}{8}$	$7\frac{1}{2}$	Ben	H	No	Mo	CN	9	$18\frac{5}{16}$	$1\frac{3}{4}$	$\frac{1}{16}$	.008	.004	130.0	47.0	UL	RS	Int	9	$18\frac{5}{8}$	$1\frac{3}{4}$	$\frac{1}{16}$	.010	51

ABBREVIATIONS:

*—Rear shoes, rear wheels, toe .007, heel .007. All other shoes front and rear, toe .006, heel .007
4W—All four service brakes
(a)—Front brakes, 2 inches, rear $2\frac{1}{4}$ inches
(b)—Front brakes $2\frac{1}{2}$ inches, rear $2\frac{1}{4}$ inches
(c)—Front $25\frac{1}{16}$, rear $22\frac{3}{16}$
(d)—11+ on C.C. Six
(e)—Super Six only, C. C. Six 23.936 inches
(f)—Super Six only, C. C. Six .218
(g)—Super Six only, C. C. Six 167.56
(h)—$21\frac{1}{2}$—1803-6; $23\frac{1}{2}$—1804-7; $26\frac{1}{4}$—1805-8
(k)—196 sq. in.—1803-6
234 sq. in.—1804-5-7-8
(l)—$24\frac{1}{16}$—1803-6; 26—1804-5-7-8
(m)—2 on 1803-6; $2\frac{1}{4}$ on 1804-5-7-8
AS—Alloy Steel
BD—Bendix or Delco
Ben—Bendix
Ce—Centrifuse
Cl—Cast Iron
CL—Cam and Lever
CN—Chrome Nickel
CR—Under Cowl at Right
DA—Duo Automatic Hydraulic
Df—Drag free.
Ext—External
FA—Fore and Aft Steering
Gem—Gemmer Mfg. Co.
H—Hydraulic
Haw—Hawley
Int—Internal
Lg—Longitudinal
Loc—Lockheed
M—Mechanical
Mo—Moulded
N—No, None or Negative
OF—On Floor
Par—Parallelogram
PS—Propellor Shaft
RB—Recirculating Ball
Rcs—Relay Cross Steering
Ro—Ross
RS—Rear Service Brakes
Sag—Saginaw
SC—Self Centralizing
St—Steel
Tra—Transverse
UL—Under Cowl at Left
VP—Vacuum Power
WM—Woven on Primary, Moulded on Secondary
Wo—Woven
WR—Worm and Roller
Y—Yes

(b)—Front brakes 2½ inches, rear 2¾ inches

Bearings—Rear Axle, King Pin and Wheel

Line Numbers	PASSENGER CAR MAKE AND MODEL	REAR AXLE			KING PIN			WHEELS			Line Numbers
		PINION OR WORM SHAFT							FRONT		
		Front	Rear	Differential	Upper	Lower	Thrust	Rear	Inner	Outer	
1	Bantam 65	Tim 15100-15250	Tim 15100-15250	Tim 14138-14277	Bz ½x⅝x1 3/32	Bz ½x⅝x1 3/32	None	Tim 1757-1729	Tim 07098-07204	Tim 05062-05185	1
2	Buick-Special 40-40	ND 5607	Hy C-1507	Hy KA-11445	Sb .863x.987x1¼	Sb .863x.987x1¼	NH 134630 or 148393	Hy C-1502	ND 909052	ND 909001	2
3	Buick-Super 40-50	ND 5607	Hy C-1507	Hy KA-11445	Sb .863x.987x1¼	Sb .863x.987x1¼	NH 134630 or 148393	Hy C-1502	ND 909052	ND 909001	3
4	Buick-Century 40-60	ND 5607	Hy C-1507	Hy KA-11445	Sb .863x.987x1¼	Sb .863x.987x1¼	NH 134630 or 148393	Hy C-1502	ND 909052	ND 909001	4
5	Buick-Roadmaster 40-70	ND 5607	Hy C-1507	Hy KA-11445	Sb .863x.987x1¼	Sb .863x.987x1¼	NH 134630 or 148393	Hy C-1502	ND 909052	ND 909001	5
6	Buick-Limited 40-80	ND 5607	Hy C-1507	Hy KA-11630	Sb 1.063x1.181x1½	Sb 1.063x1.181x1½	Nice 1289123	Hy C-1508	ND 909028	ND 909027	6
7	Buick-Limited 40-90	ND 5607	Hy C-1507	Hy KA-11630	Sb 1.063x1.181x1½	Sb 1.063x1.181x1½	Nice 1289123	Hy C-1508	ND 909028	ND 909027	7
8	Buick-Limited 40-60S	Tim 3880-3820	Tim 3779-3732	Tim 25584T-25526	Bz ⅝x¾x1¼	Bz ⅝x¾x1¼	Spb 230679	ND 88128	ND 909052	ND 909001	8
9	Cadillac-V8 40-62	Tim 3880-3820	Tim 3779-3732	Tim 25584T-25526	Bz ⅝x¾x1¼	Bz ⅝x¾x1¼	Spb 230679	ND 88128	ND 909052	ND 909001	9
10	Cadillac-V8 40-72	Tim 4162-46368	Tim 59200-59412	Tim 28677T-28622	Bz ⅝x¾x1¼	Bz ⅝x¾x1¼	Spb 230679	ND 88128	ND 909052	ND 909023	10
11	Cadillac-V8 40-75	Tim 4162-46368	Tim 59200-59412	Tim 28677T-28622	Bz ⅝x¾x1¼	Bz ⅝x¾x1¼	Spb 230679	ND 88128	ND 909024	ND 909027	11
12	Cadillac-V8 40-90	Tim 4162-46368	Tim 59200-59412	Tim 28677T-28622	Bz ⅝x¾x1¼	Bz ⅝x¾x1¼	Spb 230679	ND D88609	ND 909028	ND 909027	12
13	Cadillac-V16 85	ND 5306	Hy C-1506	Hy KA-11360	Nb 1x1¼x1	Nb 1x1¼x1	Nice 4985	ND D88609	ND 909028	ND 909001	13
14	Chevrolet-Master	ND 5306	Hy C-1506	Hy KA-11360	Nb 1x1¼x1	Nb 1x1¼x1	Nice 4985	Hy C-1500	ND 909002	ND 909001	14
15	Chevrolet-Spec. DeL. & Mas. DeL.	Tim 31590-31520	Tim 31593-31520	Tim 25580-25520	Bz ⅝x¾x1 1/32	Bz ⅝x¾x1 1/32	ND ¾x⅞	Hy C-1500	ND 909002	ND 909001	15
16	Chrysler-Windsor & Royal C-25	Tim 3476-3420	Tim 3875-3820	Tim 25580-25520	Bz ⅝x¾x1 1/32	Bz ⅝x¾x1 1/32	ND ¾x⅞	Tim 25877-25821	Tim 14125-A—14276	Tim 09074-09194	16
17	Chrysler-Saratoga & N. Y. C-26	Tim 3878-3820	Tim 46176-46368	Tim 28580-28521	Bz ⅞x1⅛x1 5/16	Bz ⅞x1⅛x1 5/16	BB .803x1.563x.563	Tim 2780-2736	Tim 2585-2523	Tim 1755-1729	17
18	Chrysler-Crown Imperial C-27	Tim 1380-1328	Tim 1380-1328	Tim 14138-14277	Bz ⅞x1⅛x1 5/16	Bz ⅞x1⅛x1 5/16	BB .945x1.750x.563	Tim 26880-26822	Tim 2877-2820	Tim 1280-1220	18
19	Crosley A	Tim 31590-31520	Tim 31593-31520	Tim 25580-25520	Bz ⅞x1⅛x1 5/16	Bz ⅞x1⅛x1 5/16	BB .945x1.750x.563	Tim 15575T-15520	Tim 1380-1328	Tim 17580-17520	19
20	DeSoto-Custom S-7	T-B 31590-31520	T-B 31593-31520	T-B 25580-25520	LbS .797x.925x1.200	LbS .797x.925x1.200	Bz ⅛x	Tim 25877-25821	Tim 14125A-14276	Tim 09074-09194	20
21	Dodge D-14-17	Tim 799056-799055		Tim 799115-799116			BB .803x1.563x.563	T-B 25877-25821	T-B 14125A-14276	T-B 09074-09194	21
22	Ford V8-60	Tim 799056-799055	Tim 31593-31520	Tim 25577-25523	Bz	Bz	BR .803x1.563x.563		Tim 799072-799076	Tim 799061-799065	22
23	Ford V8-85	Tim 02872-02820	Tim 31593-31520	T-B 24780-24720					Tim 799072-799076	Tim 799061-799065	23
24	Graham-DeL. & Custom 108	Tim 02872-02820	Tim 31593-31520	T-B 24780-24720					Tim 14276-14123	Tim 09074-09194	24
25	Graham-Sch. & Cus. Sch. 107	Tim 02876-02820	Tim 31593-31520	T-B 24780-24720					Tim 14276-14123	Tim 09074-09194	25
26	Graham-Sch. & Cus. Sch. 40	Tim 02876-02820	Tim 31593-31520	Tim-25584T-25526					Tim 15118-15250	Tim 09078-09195	26
27	Hudson-Six 41-43	Tim 02876-02820	Tim 31593-31520	Tim 799019-799018	Bz ⅝x¾x1¼	Bz ⅝x¾x1¼	Spb 230679		Tim 15118-15250	Tim 09078-09195	27
28	Hudson-Super & C. C. Six 44-47	Tim 02876-02820	Tim 3779-3732	Tim 799115-799116					Tim 15118-15250	Tim 09078-09195	28
29	Hudson-Eight & C. C. Eight 40-50, 40-52	Tim 3880-3820	Hy 1306-TS	Tim 799115-799116					ND 909052	ND 909001	29
30	La Salle V12	Tim 799105-799094(2)	Tim 799124-799125	Tim 25580-25523					Tim 799049-799048	Tim 799044-799043	30
31	Lincoln V12	Tim 799126-799127		Tim 25580-25523	Bsb ⅞x⅞x1 1/16	Bsb ⅞x⅞x1 1/16	Hoover A-3123-B	Tim 2798T-2726	Tim 799072-799076	Tim 799061-799065	31
32	Lincoln-Zephyr V8-95	Tim 799056-799055	Tim 3877-3820	Tim 25580-25523	Bsb .817x.941x1 1/16	Bsb .817x.941x1 1/16	Hoover 3123-B	Tim 2798T-2726	Tim 14138A-14274	Tim 09078-09195	32
33	Mercury 4010	Tim 31590-31520	Tim 3877-3820	Hy A165275	Bsb .862x.985x1 1/16	Bsb .862x.985x1 1/16	Hoover 3061	Tim 26876T-26820	Tim 14138A-14274	Tim 09078-09195	33
34	Nash-LaFayette 4020	Tim 31590-31520	Hy C-1509	Hy A165275	Bsb 231905	Bsb 231905	ND 230679	ND 954172	Tim 14138A-14274	Tim 1755-1729	34
35	Nash-Ambassador 6 4080	Tim 31590-31520	Hy C-1599	Hy A165275	Bsb 231905	Bsb 231905	ND 230679	ND 954172	ND 909052	ND 909001	35
36	Nash-Ambassador 8 60	ND 5306	Hy C-1509	Tim 25580-25520	Bsb 231905	Bsb 231905	Hov 3003-A	ND 954172	ND 909052	ND 909001	36
37	Oldsmobile-Six 70	ND 5306	T-B 3877-3820A	Tim 2984-2924	Tor RB-1557	Tor RB-1557	Hov 3003-A	Tim 25877-25821	ND 909052	ND 909001	37
38	Oldsmobile-Six	ND 5306	T-B 3776A-3735	Tim 2984-2924	Tor RB-1557	Tor RB-1557	Hov 3003-A	Tim 26878-26830	Tim 14130-14276	Tim 09074-09194	38
39	Oldsmobile-Custom 8 Cruiser 1800	T-B 31590-31520	T-B 3776A-3735	Tim 2984-2924	Tor RB-1557	Tor RB-1557	Hov 3003-A	Tim 26878-26830	Tim 2585-2523	Tim 1380-1329	39
40	Packard-One Ten 1801	T-B 3879-3820	T-B 3776A-3735	Tim 2984-2924	Tor RB-1557	Tor RB-1557	Hov 3003-A	Tim 26878-26830	Tim 2585-2523	Tim 1380-1329	40
41	Packard-One Twenty 1803-4-5	T-B 3879-3820	T-B 3776A-3735	Tim 25580-25520	LbS .797x.925x1.200	LbS .797x.925x1.200	BB .803x1.563x.563	Tim 25877-25821	Tim 2585-2523	Tim 1380-1329	41
42	Packard-Super Eight 1806-7-8	T-B 3879-3820	Tim 31593-31520	Tim 25580-25520	LbS .797x.925x1.200	LbS .797x.925x1.200	BB .803x1.563x.563	ND 88128	Tim 14125A-14276	Tim 09074-09194	42
43	Packard-Cus. Sup. Eight P-9	Tim 31590-31520	Tim 31593-31520	Hy A165275	Bz .863x1.054x 11/16	Bz .863x1.054x 11/16	Spb 230679	ND 88128	Tim 14125A-14276	Tim 09074-09194	43
44	Plymouth-Roadking P-10	Tim 31590-31520	Hy C-1509	Hy A165275	Bz .863x1.054x 11/16	Bz .863x1.054x 11/16	Spb 230679	ND 88128	Tim 14125A-14276	Tim 09074-09194	44
45	Plymouth-DeLuxe 40-25	ND 5306	Hy C-1509	Hy A165275	Bz .863x1.054x 11/16	Bz .863x1.054x 11/16	Spb 230679	ND 88128	ND 909052	ND 909001	45
46	Pontiac-Special 6 40-26	ND 5306	Hy C-1509	Hy A165275	Bz .863x1.054x 11/16	Bz .863x1.054x 11/16	Spb 230679	ND 88128	ND 909052	ND 909001	46
47	Pontiac-DeLuxe 6 40-28	ND 5306	Hy C-1509	Hy A165275	Bz .863x1.054x 11/16	Bz .863x1.054x 11/16	Spb 230679	ND 88128	ND 909052	ND 909001	47
48	Pontiac-DeLuxe 8 40-29	ND 5306	Hy C-1509	Tim 24780-24721	Tor B-1816	1½x1½x¾	Nice 5136	Tim 14123T-14276	ND 909052	Tim 17580-17520	48
49	Pontiac-Torpedo 8 2G	Tim 02872-02820	Tim 31593-31520	Tim 25577-25523	Tor B-2016	1.193x1.315x1¼	Nice 5920	Tim 25877-25821	Tim 15580-15520	Tim 09074-09194	49
50	Studebaker-Champion 6 10A	Tim 02872-02820	Tim 31593-31520	Tim 25577-25523	Tor B-2016	1.193x1.315x1¼	Nice 5920	Tim 25877-25821	Tim 14125-14274	Tim 09074-09194	50
51	Studebaker-Commander 6 6C	Tim 02872-02820	Tim 31593-31520	Tim 16150-16284	Bz ¾x	Bz ¾x	Mat 7206-T3	Tim 2580T-2523	Tim 14125-14274	Tim 09074-09194	51
	Studebaker-President 8 440	Tim 02474-02420	Tim 3193-3120						Tim 15118-15250		
	Willys										

ABBREVIATIONS:
BB—Ball bearing
Bow—Bower
Bsb—Bronze-steel backed
Bz—Bronze bushing
Hy—Hyatt
LbS—Lead bronze on Steel
Mat—Mathews
Nb—Needle bearing
ND—New Departure
NH—Nice or Hoover
Sb—Split bushing
Spb—Special ball bearing
T-B—Timken or Bower
Tim—Timken
Tor—Torrington

Bearings—Electrical Units, Clutch, Transmission

Line Numbers	PASSENGER CAR MAKE AND MODEL	WATER PUMP	STARTER		GENERATOR		CLUTCH		TRANSMISSION					Line Numbers
		Shaft and Bearing Assembly	Commutator End	Drive End	Commutator End	Drive End	Pilot	Throwout	Clutch Shaft or Drive Shaft Rear	MAIN SHAFT Pilot	MAIN SHAFT Rear	Counter Shaft	Reverse Idler	
1	Bantam 65	None	Bz $\frac{7}{16}$x$\frac{3}{8}$x$1\frac{1}{2}$	Bz $\frac{11}{16}$x1x$\frac{7}{8}$	BB SAE-201	BB SAE-202	OB .631x.815x$1\frac{1}{16}$	At 893-1	An 1207	Hy RA 9321-B	An 1305	SB $\frac{13}{32}$x$\frac{3}{4}$x$1\frac{1}{4}$	SB $\frac{5}{16}$x$\frac{3}{4}$x$\frac{13}{32}$	1
2	Buick-Special 40-40	ND 88156	Cl .563x$1\frac{1}{2}$	Obs .500x.562x$\frac{13}{32}$	Bu .562x.783x$\frac{21}{32}$	ND 3203	ND 7109	ND CT-24B	ND 47507	14 rollers	ND 3206	Roller	.850x.987x$\frac{3}{4}$	2
3	Buick-Super 40-50	ND 88156	Cl .563x$1\frac{1}{2}$	Obs .500x.562x$\frac{13}{32}$	Bu .562x.783x$\frac{21}{32}$	ND 3203	ND 7109	ND CT-24B	ND 47507	14 rollers	ND 3206	Roller	.850x.987x$\frac{3}{4}$	3
4	Buick-Century 40-60	ND 88156	Cl .563x$1\frac{1}{2}$	Obs .500x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{21}{32}$	ND 3203	ND 7109	ND CT-24A	ND 47507	14 rollers	ND 43306	26 rollers	Bu .847x.987x1	4
5	Buick-Roadmaster 40-70	ND 88156	Cl .563x$1\frac{1}{2}$	Obs .563x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{21}{32}$	ND 3203	ND 7109	ND CT-24A	ND 47507	14 rollers	ND 43306	26 rollers	Bu .847x.987x1	5
6	Buick-Limited 40-80	ND 88156	Cl .563x$1\frac{1}{2}$	Obs .563x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{21}{32}$	ND 3203	ND 7109	ND CT-24A	ND 47507	14 rollers	ND 43306	26 rollers	Bu .847x.987x1	6
7	Buick-Limited 40-90	ND 88156	Cl .563x$1\frac{1}{2}$	Obs .563x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{21}{32}$	ND 3203	ND 7109	ND CT-24A	ND 47507	14 rollers	ND 43306	26 rollers	Bu .847x.987x1	7
8	Cadillac-V8 40-60S	ND C88016	Cl	Bz $\frac{3}{4}$x$\frac{1}{2}$x$\frac{23}{32}$	Bz $\frac{7}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA C.T.D.S-56	ND 47508		ND 47508-7	Needles	BSb $\frac{7}{16}$x1x1	8
9	Cadillac-V8 40-62	ND C88016	Cl	Bz $\frac{3}{4}$x$\frac{1}{2}$x$\frac{23}{32}$	Bz $\frac{7}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA C.T.D.S-56	ND 47508		ND 47508-7	Needles	BSb $\frac{7}{16}$x1x1	9
10	Cadillac-V8 40-72	ND C88016	Cl	Bz $\frac{3}{4}$x$\frac{1}{2}$x$\frac{23}{32}$	Bz $\frac{7}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA C.T.D.S-56	ND 47508		ND 47508-7	Needles	BSb $\frac{7}{16}$x1x1	10
11	Cadillac-V8 40-75	ND C88016	Cl	Bz $\frac{3}{4}$x$\frac{1}{2}$x$\frac{23}{32}$	Bz $\frac{7}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA C.T.D.S-56	ND 47508		ND 47508-7	Needles	BSb $\frac{7}{16}$x1x1	11
12	Cadillac-V16 40-90	ND 88016(4)	Bz $\frac{1}{16}$x$\frac{3}{16}$x$\frac{7}{8}$	Bz $\frac{3}{4}$x$\frac{1}{2}$x$\frac{23}{32}$	ND 88503	ND 88503	ND 7502	BCA CTS-66-A	ND 47508		ND 47508-7	Needles	BSb $\frac{7}{16}$x1x1	12
13	Chevrolet-Master 85	ND 886159	$\frac{1}{16}$x$\frac{1}{2}$	None	Bz $\frac{23}{32}$x$\frac{13}{16}$x$\frac{11}{16}$	ND 3203	Hy RA-99004	ND CT-22	ND 43207	Rollers $\frac{3}{16}$x$\frac{23}{32}$	ND 43305	Bz $\frac{7}{16}$x1x$1\frac{1}{4}$	Bz $\frac{3}{4}$x$\frac{7}{16}$x$\frac{3}{4}$	13
14	Chevrolet-Spec. DeL. & Mas. DeL.	ND 886159	$\frac{1}{16}$x$\frac{1}{2}$	None	Bz $\frac{23}{32}$x$\frac{13}{16}$x$\frac{11}{16}$	ND 3203	Hy RA-99004	ND CT-22	ND 43207	Rollers $\frac{3}{16}$x$\frac{23}{32}$	ND 43305	Bz $\frac{7}{16}$x1x$1\frac{1}{4}$	Bz $\frac{3}{4}$x$\frac{7}{16}$x$\frac{3}{4}$	14
15	Chrysler-Windsor & Royal C-25	None	AL GBF-79	AL MP-41-A	AL GBF-79	BB SAE-203	OL .753x.941x.875	BCA 4950A or At A935-1	(a)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	15
16	Chrysler-Saratoga & N. Y. C-26	MR 5200-FFS-4	AL GBF-79	AL MP-41-A	AL GBF-79	BB SAE-203	OL .753x.941x.875	BCA 4950A or At A935-1	(b)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	16
17	Chrysler-Crown Imperial C-27	MR 5200-FFS-4	AL GBF-79	AL MP-41-A	AL GBF-79	BB SAE-203	Tor B-1212-X	At A-903	(b)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	17
18	Crosley A	None	AL	AL	AL	AL	At	At						18
19	DeSoto-Custom S-7	None	AL GBF-79	AL MP-41-A	AL GBF-79	BB SAE-203	OL .753x.941x.875	BCA 4950A or At A935-1	(a)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	19
20	Dodge D-14-17	None	AL MZ-40-A	AL MP-41-A	AL GBF-79	BB SAE-203	OL .753x.941x.875	BCA 4950A or At A935-1	(c)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	20
21	Ford V8-60													21
22	Ford V8-85							At A-893						22
23	Graham-DeL. & Custom 108		Bz	Bz	Bz		Bz	At A-893-1	1207		1207	Needles	Bz	23
24	Graham-Sch. & Cus. Sch. 107							At A-893-1						24
25	Hudson-Six 40				AL	ND 3203	ND	BCA 1$\frac{5}{16}$x2$\frac{13}{32}$	ND 3205	Ban 26-$\frac{3}{4}$x$1\frac{1}{16}$	ND 42108	BSb	BSb	25
26	Hudson-Super & C. C. Six 41-43					ND 3203	ND	BCA 1$\frac{5}{16}$x2$\frac{13}{32}$	ND 3205	Ban 26-$\frac{3}{4}$x$1\frac{1}{16}$	ND 42108	BSb	BSb	26
27	Hudson-Eight & C. C. Eight 44-47					ND 3203	ND	BCA 1$\frac{5}{16}$x2$\frac{13}{32}$	ND 3205	Ban 26-$\frac{3}{4}$x$1\frac{1}{16}$	ND 42108	BSb	BSb	27
28	La Salle 40-50, 40-52	ND C88016	Cl	Bz $\frac{3}{4}$x$\frac{1}{2}$x$\frac{23}{32}$	Bz $\frac{7}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA C.T.D.S-56	ND 47508		ND 4750E-7	Needles	BSb $\frac{7}{16}$x1x1	28
29	Lincoln V12							At A-893-3				Hy RA-94736		29
30	Lincoln-Zephyr V12							At A-893						30
31	Mercury V8-95													31
32	Nash-LaFayette 4010	Bz	AL	AL	ND 3203	ND 3203	Gb .790x1.094x$1\frac{1}{8}$	At A-899-2	Hov 7207-G	19 rollers .218x.531	Hov 7207	LbS .864x1x$1\frac{1}{2}$	LbS .864x1x$\frac{3}{4}$	32
33	Nash-Ambassador 6 4020	Bz	AL	AL	ND 3203	ND 3203	Gb .790x1.094x$1\frac{1}{8}$	At A-899-2	Hov 7207-G	14 rollers .218x.531	Hov 7207	LbS .864x1x$1\frac{1}{2}$	LbS .864x1x$\frac{3}{4}$	33
34	Nash-Ambassador 8 4080	Bz	AL	AL	ND 3203	ND 3203	Gb .790x1.094x$1\frac{1}{8}$	At A-899-2	Hov 7207-G	14 rollers .218x.531	Hov 7207	LbS .864x1x$1\frac{1}{2}$	LbS .864x1x$\frac{3}{4}$	34
35	Oldsmobile-Six 60	ND 885140-A	$\frac{3}{16}$x$\frac{13}{16}$	None	Bu	ND 3203	Roller		ND 47507	Roller	ND 7506	Roller	Bz	35
36	Oldsmobile-Six 70	ND 885140-A	$\frac{3}{16}$x$\frac{13}{16}$		Bu	ND 3203	Roller		ND 47507	Roller	ND 7506	Roller	Bz	36
37	Oldsmobile-Custom 8 Cruiser	ND 885140-A	$\frac{3}{16}$x$\frac{13}{16}$		Bu	ND 3203			ND 47507	Roller	ND 7506		Bz	37
38	Packard-One Ten 1800	MR 5200-FFS-11	AL MZ-40A	AL MP-41-A	AL GBS-79	ND 3203	MR 7109	BCA 4765-A	(g)	BCA 94516	(h)	Ban B-1316-Q		38
39	Packard-One Twenty 1801	MR 5200-FFS-11		AL MG-77-A	AL GBS-79	ND 3203	MR 7109	BCA 4765-A	(g)	BCA 94516	(h)	Ban B-1316-Q		39
40	Packard-Super Eight 1803-4-5	MR 5200-FFS-11		AL MP-44-A	AL GBS-79	ND 3203	NH	BCA 4506-A	(g)	BCA 94516	(h)	Ban B-1316-Q		40
41	Packard-Cus. Sup. Eight 1806-7-8	MR 5200-FFS-11		AL MP-44-A	AL GBS-79	ND 3203	NH	BCA 4506-A	(g)	BCA 94516	(h)	Ban B-1316-Q		41
42	Plymouth-Roadking P-9	None	AL MZ-40-A	AL MP-41-A	AL GBF-79	BB SAE-203	OL .753x.941x.875	BCA 4950A or At A935-1	(c)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	42
43	Plymouth-DeLuxe P-10	None	AL MZ-40-A	AL MP-41-A	AL GBF-79	BB SAE-203	OL .753x.941x.875	BCA 4950A or At A935-1	(c)	14 rollers .2181x.5313	(d)	22 rollers .125x.906	22 rollers .125x.906	43
44	Pontiac-Special 6 40-25	ND 885158-A	Cl $\frac{9}{16}$x$\frac{31}{32}$	Obs $\frac{5}{16}$x$\frac{13}{16}$x$\frac{25}{32}$	Durex	ND 3203	Hy RA-99004	Gra 1$\frac{1}{2}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy	ND 7506	Rollers $\frac{1}{16}$x$\frac{13}{16}$	Bz .850x.987x$\frac{3}{4}$	44
45	Pontiac-DeLuxe 6 40-26	ND 885158-A	Cl $\frac{9}{16}$x$\frac{31}{32}$	Obs $\frac{5}{16}$x$\frac{13}{16}$x$\frac{25}{32}$	Durex	ND 3203	Hy RA-99004	Gra 1$\frac{1}{2}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy	ND 7506	Rollers $\frac{1}{16}$x$\frac{13}{16}$	Bz .850x.987x$\frac{3}{4}$	45
46	Pontiac-DeLuxe 8 40-28	ND 885140-A	Cl $\frac{9}{16}$x$\frac{31}{32}$	Obs $\frac{5}{16}$x$\frac{13}{16}$x$\frac{25}{32}$	Durex	ND 3203	Hy RA-99004	Gra 1$\frac{1}{2}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy	ND 7506	Rollers	Bz .850x.987x$\frac{3}{4}$	46
47	Pontiac-Torpedo 8 40-29	ND 885140-A	Cl $\frac{9}{16}$x$\frac{31}{32}$	Obs $\frac{5}{16}$x$\frac{13}{16}$x$\frac{25}{32}$	Durex	ND 3203	Hy RA-99004	Gra 1$\frac{1}{2}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy	ND 7506	Rollers	Bz .850x.987x$\frac{3}{4}$	47
48	Studebaker-Champion 6 2G	ND 885162	Pl .638x$\frac{3}{4}$x$1\frac{1}{2}$	Pl $\frac{5}{16}$x$\frac{3}{4}$x$1\frac{1}{4}$	Pl $\frac{5}{16}$x$\frac{3}{4}$x$1\frac{1}{4}$	ND 3203	$\frac{5}{16}$x$1\frac{1}{16}$x$\frac{3}{4}$	BCA 4768-A	MR 207-SFG	Hy RA-93218	MR 206-SFG	CG $\frac{5}{16}$x$\frac{3}{4}$x$1\frac{1}{4}$	CG $\frac{5}{16}$x$\frac{3}{4}$x$\frac{13}{16}$	48
49	Studebaker-Commander 6 10A	$\frac{1}{2}$x$1\frac{7}{16}$	Pl .638x$\frac{23}{32}$x$\frac{5}{16}$	Pl .500x.628x$\frac{11}{64}$	Pl .754x.626x$\frac{31}{64}$	ND 3203	$\frac{3}{4}$x$1\frac{1}{2}$x$\frac{7}{8}$	(e)	MR 207-SG	14 rollers $\frac{3}{16}$x$\frac{17}{32}$	(f)	Ban C-407-Q(22)	Pl $\frac{3}{4}$x.887x$1\frac{1}{16}$	49
50	Studebaker-President 8 6C	$\frac{1}{2}$x$1\frac{7}{16}$	Pl $\frac{5}{16}$x$\frac{3}{4}$	Gb $\frac{5}{16}$x$\frac{5}{8}$x$\frac{3}{4}$	Pl .553x.784x$\frac{11}{64}$	ND 3203	Hy RA-133	BCA 4959-A		14 rollers $\frac{3}{16}$x$\frac{17}{32}$	(f)	Ban C-407-Q(22)	Pl $\frac{3}{4}$x.887x$1\frac{1}{16}$	50
51	Willys 440	ND 885141	Bu	Bu	Bu	ND 3203	Bu	BCA 4768-A	Fed 1207-CGF	Hy RA-93218	Ball	Bu	Bu	51

ABBREVIATIONS:

(4)—Four used
(a)—MR 207-MFG or SKF I-70822
(b)—MR TF-7-1 or SKF 465679
(c)—MR 207-SFG or SKF I-71659
(d)—MR 207-S or SKF I-71658-B
(e)—BCA 4375-A or Ban H-314-A
(f)—MR 207-S or SKF I-71658-B
(g)—Marlin-Rockwell 209-CFG or SKF 465699
(h)—Marlin-Rockwell 306-SG or SKF 465058-BNR

AL—Auto-Lite
An—Annular
At—Aetna Ball Bearing Mfg. Co.
Ban—Bantam Bearing Co.
BB—Ball bearing
BCA—Bearings Company of America
BSb—Babbitt steel back
Bu—Bushing
Bz—Bronze bushing
CG—Cleveland Graphite Bronze Co.
Cl—Cast Iron
Fed—Federal Bearings Co.
Gb—Graphite bronze
Gra—Graphite ring
Hov—Hoover
Hy—Hyatt Bearings Div.
LebS—Lead bronze, steel back
MR—Marlin-Rockwell Corp.
ND—New Departure Division
NH—Norma-Hoffman
OB—Oilless bronze
Obs—Oilless bushing
OL—Oilite **Pl**—Plain **SB**—Split bronze

AUTOMOTIVE INDUSTRIES

Just among Ourselves

WE HAVE just completed preparing a chronology of strikes in the automobile industry covering the years 1938 to date. Once again, after an examination of these data, it becomes apparent that rising production is likely to be accompanied by strikes for higher hourly rates.

On Tuesday, Oct. 17, at a luncheon given by Alfred P. Sloan, Jr., chairman of General Motors, Dr. Harold G. Moulton, president of the Brookings Institution in Washington, declared firmly that "advances in industrial prices at this time should be resisted to the utmost."

"We should seek to make increased profits," said Doctor Moulton, "by a fuller and steadier utilization of capacity, and by an ever-increasing efficiency in production. Similarly, the laboring population should focus attention upon the realization of more and steadier employment instead of upon hourly wage increases."

"The only real profits," he continued, "like the only real wages, are those which arise from increased production. Profits resulting merely from purchasing goods at one price and selling them in advance are not of a constructive character; that is, they are not backed by tangible goods and services and thus add nothing in primary terms to the wealth of society. . . .

"If all groups in the body politic will work together at this juncture in clear realization of the fundamental requirements of the situation, it will be possible not only for all classes of the American people to receive higher levels of real income, but also for this nation to maintain financial and economic stability, and thereby make its most effective contribution to eventual restoration of economic stability and progress in the world as a whole."

It is a sad fact, in the light of Doctor Moulton's clear analysis, that hourly wage rates are the chief bargaining basis in most of the current crop of labor disputes in the industry. It is seldom that any dispute is argued on a single issue, but it is true that most of the settlements are made with some adjustment of the hourly wage rate.

All such matters as union recognition, the check off, vacations with pay, abolition of the "speed up," become relatively unimportant as compared with the preoccupation of union officials with obtaining increments on the hourly rate.

A good many of them realize, we imagine, the fundamental truth in economic doctrine like that laid down by Doctor Moulton. But hourly wage increments are something that the average worker can understand, and if the union can get them for him, he's sold on the union which can do it.

We wonder if it isn't about time for some pioneering labor leader to come forth with a proposal that he be given a vote of confidence on a proposal to work with management on ways and means of increasing production by whatever economic methods will react to the *eventual* and *protracted* benefit of the worker. Labor has done a good job in educating workers in balance-sheet economics. But, as Doctor Moulton implies, there's a big job to be done in pointing out that the welfare of all of us goes beyond the balance sheet of a single enterprise.

A Pilot Pump and a Main Pump

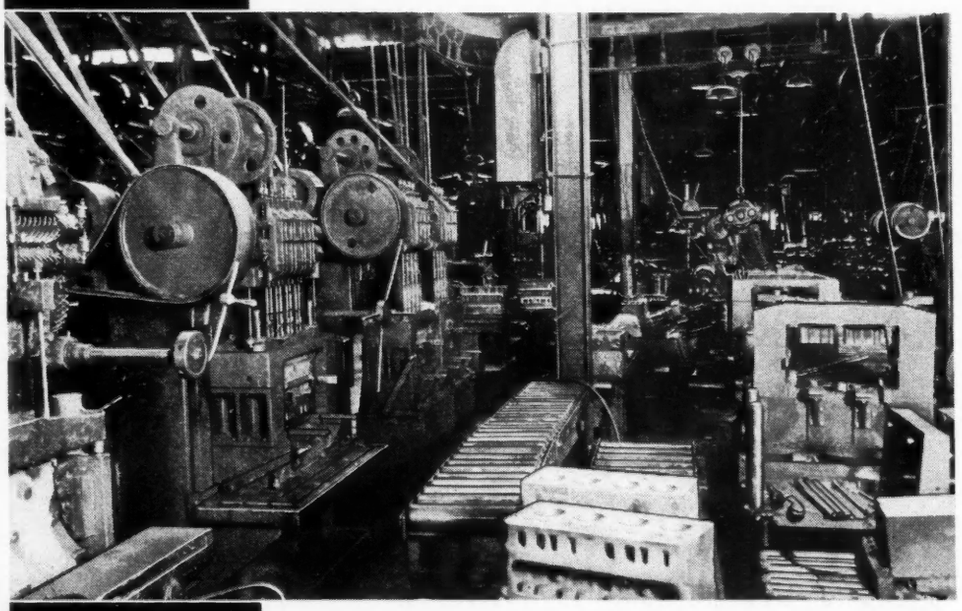
DURING recent years there has been a good deal of talk regarding pilot injection as a means of reducing peak pressures in Diesel engines, and a British patent recently issued covers the combination of a separate pilot pump with a main injection pump. The pilot-pump cylinder is arranged at an angle of approximately 45 deg. with the main cylinder, and both discharge through a common delivery valve. Both plungers are operated by a common camshaft, the plunger of the pilot pump from a separate cam through a rocker lever, and control of the pilot charge is effected in the same manner as that of the main charge, by rocking the pump plunger around its axis by means of a pinion and rack.

This, of course, is one possible solution of the problem, but apparently a needlessly complicated and expensive one. Instead of a single pump cylinder and plunger per engine cylinder, as in the conventional injection pump, there must be two cylinders and two plungers, as well as two control mechanisms, and the elements of the pilot pump, because of their extremely small size, undoubtedly involve greater manufacturing difficulties than the corresponding elements of the main pump. It would seem to be a much simpler and more promising plan to so work out the cam mechanism that the regular pump plunger is first listed through a sufficient distance to produce the proper pilot injection, then brought to a stop from its upward motion or even slightly retracted, and finally put through the remainder of the injection stroke. The working out of a cam mechanism to give this interrupted lifting motion might involve some difficulties, but these should not be insuperable. Not the least advantage of this simple system of pilot injection over that involving a separate pilot-pump cylinder would be that with the former leakage from the pump chamber can take place only past a single plunger, instead of past two; leakage, therefore, should be materially less, and the risk of failure to start due to failure of the pump to deliver a charge at low cranking speeds should be correspondingly reduced.—H.H.-P.M.H.

Continental Motors

By JOSEPH GESCHELIN

BACK in the days of "normalcy," when the roster of motor car builders included scores of pioneers instead of today's relatively small compact group of important producers, the name Continental was one to conjure with. For in those days, Continental Motors was listed in the specifications of many famous makes, served as the experimental production and development department for many others.



As indicated in the text, Continental has a number of cylinder block machine lines to handle the variety of blocks. This is a special line tooled for high production four-cylinder blocks.

More recently, with the changing character of the automotive industry as constituted today, Continental Motors Corp. adopted a new approach, the soundness of which may be measured by the fact that the company's plant has been a beehive of activity during the past two years. Still continuing its role as engine specialist to the industry, Continental redesigned and modernized its line of engines so as to suit the needs of industrial and agricultural equipment producers.

Starting with a small group of perhaps eight basic engine sizes, the line has been expanded to include some 21 distinct models of heavy duty engines primarily for industrial use. Among these are several models for motor trucks, one marine job, and even one passenger car engine. It is of interest to note that certain producers have found it desirable to purchase most of the major elements of their engines, machined completely, then to assemble the engines in their own plants.

Under the new set-up, Continental has become a source of supply of component parts for heavy-duty engines, with business coming from competitive builders who take advantage of the favorable cost situation created by these flexible manufacturing facilities. Among the parts supplied by the company are: crankshafts, camshafts, cylinder blocks, pistons, connecting rods, flywheels, flywheel housings, sheet metal oil pans, front and rear end plates, cylinder heads, manifolds.

Too, Continental has made a niche for itself as an outstanding producer of small aircraft engines, accounting for an estimated 79 per cent of the volume of such engines during the past few

Final test and inspection lines assure the quality and performance of Continental engines.

years. In 1938 the major light plane manufacturers produced 1413 planes, 1118 being powered by Continental 40 hp. and 50 hp. aircraft engines. During 1939 the company introduced the 65 hp. and 75 hp. engines designed along the same line as the present 50 hp. job. The 50, 65 and 75 hp. engines also are available with fuel injection in place of the conventional carburetor.

Principal customers in the small aircraft field are Piper Aircraft Corp., Aeronautical Corp. of America, Taylorcraft Aviation Corp., Luscombe Airplane Co., and Stinson. The complete line of aircraft engines at the present writing includes the following power ratings—40-50-65-75-225-230-240-250.

The company was founded in Chicago in 1902 by Ross W. Judson for the purpose of manufacturing four-cylinder, four-cycle L-head gasoline engines. In 1906 the company moved to Muskegon because of increasing business and the need for more space and high production facilities. By 1911 Continental found it necessary to move to Detroit so as to be closer to the large group of manufacturers whom it was serving.

The impressive mass production plant in Detroit was designed and erected by Albert Kahn for this purpose. It was comprised of ten buildings with a total floor space of 546,520 sq. ft., covering an area of 17.3 acres.

This is the Forty-second in the series of monthly production features

Looking down the main engine assembly line at Muskegon. Note the storage bins for miscellaneous fastenings along the wall at the left.

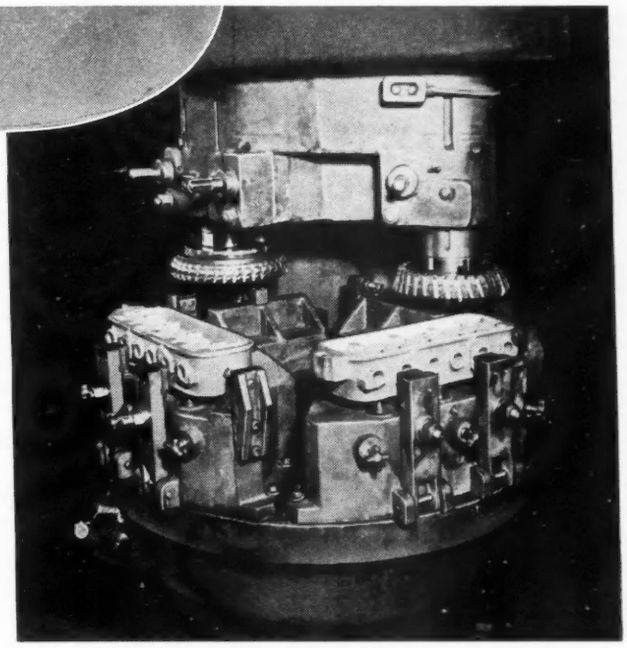
This year marks another milestone in the history of the company what with the concentration of all of its activities and production facilities in the Muskegon plant. This has been done in the interest of further improving its manufacturing economy.

The present Muskegon plant comprises some 689,231 sq. ft. of floor space of which about 400,000 sq. ft. has been used for productive purposes. Carrying out its traditional role as a research organization and supplier of power plants for the industry, Continental's Muskegon plant features an unusually flexible set-up designed for multiple-lot production of a great variety of parts. Due to the multiplicity of parts of similar character, each machine shop department has been fitted with a number

Factory Routing Cylinder Block

OPERATION	EQUIPMENT
Rough inspect	Bench
Mill top, bottom, and manifold side	Ingersoll mill—planer type
Grind oil pan contact	Pratt & Whitney surface grinder
Drill and ream locating holes	Leland-Gifford goosenecks
Mill both ends	Ingersoll mill
Drill push rod holes	Moline rail drill
Mill fuel pump and generator pads and air compressor bracket pads	Ingersoll mill
Rough bore cylinder bores	Moline boring mill
Semi-finish bore cylinder bores	Moline boring mill
Drill oil gallery line hole and distributor hole	Avey drill
Drill valve stem guide holes	Colburn drill
Counterbore for Hubbard plugs	Moline rail drill
Rough and semi-finish ream push rod and valve guide holes	American radial drill
Rough and semi-bore throat openings	Moline rail drill
Drill oil holes through tappet guides	Moline rail drill
Size ream tappet and valve guide holes	Leland-Gifford goosenecks
Counterbore spring seats	Avey drill
Water test	Moline rail drill
Rough bore cam bearings	Special fixture
Bore crank and cam bearings	Rockford boring mill
Counterbore rear cam and crank bearings	Rockford boring mill
Chamfer top of cylinder bores	Rockford boring mill
Straddle mill main bearings and cut groove	Baker drill
Mill lock slots	Ingersoll mill
Machine oil check hole	Cincinnati mill
Drill angular hole for oil check	7 in. Leland-Gifford gooseneck
Drill angular oil hole crank to gallery	7 in. Leland-Gifford gooseneck
Drill angle oil hole cam to gallery	Moline rail drill
Chamfer bottom of cylinder bores	Thor air motor
Drill top and bottom	Baker drill
Drill both ends	Baush horizontal multiple drill
Drill both sides	Baush horizontal multiple drill
Drill water circulating holes	Baush multiple drill

OPERATION	EQUIPMENT
Machine oil filler and oil gage holes	Radial drill
Countersink top holes	Thor air motor
Tap ends and counterbore two holes	Radial drill
Tap sides	Radial drill
Tap top and bottom, finish drill to depth two holes	Radial drill
Grind head contact	Pratt & Whitney grinder
Ream cylinder bores	Leland-Gifford drill
Lap cylinder bores	Baker drill
Drill name plate pin holes	Thor air drill
Finish ream cam bearings for bushings	Thor air motor
Press in cam bushings	Metalwood press
Drill and rivet cam bearings in place	Thor air drill
Assemble bearings, caps and stamp numbers	Bench
Flycut crank and cam bearings	Rockford mill
Line ream crank bearings	Bench
Finish ream and burnish cam bearings	Thor air motor
Press in valve tappet guide bushings	Hercules power press
Finish ream push rod holes and finish ream valve guide holes	Leland-Gifford drill
Machine oil pump hole, press in oil pump drive shaft sleeve	Cincinnati-Bickford radial drill
Face both sides of front crank bearing	Thor air motor
Finish mill rear end	Ingersoll mill
Ream dowel holes in rear end	Thor air motor
Press in valve guides	Metalwood press
Ream valve stem guides	Thor air motor
Chamfer valve seat clearance. Finish bore throat openings and rough and finish counterbore for exhaust valve seat inserts	Avey drill
Hand seat intake valves	Bench
Press in valve seat inserts	Hand tool
Roll in stock around exhaust valve inserts	Avey drill
Grind in exhaust valve seat inserts	Black & Decker portable valve seat grinder
Grind cylinder head contact	Blanchard grinder
Lap in valves	Defiance machine
Wash and blow off	
Drive in studs	Thor stud driver
Assemble valves	Bench
Assemble tappets and camshafts	Bench
Remove bearing caps, assemble bearings shells crankshaft and bearing caps	Bench



Overhead-valve cylinder heads are milled on Ingersoll Rotary milling machines as shown here. The inserted teeth of the large milling cutters are fitted with Haynes-Stellite J-metal tips.

of parallel machine lines which afford still greater flexibility by subdividing the work into general classifications such as—parts of small, medium, and large size, and in these categories—units produced in large volume or in multiple lots.

With the concentration of all activities at Muskegon, separate departments will be found for the large and small aircraft engines.

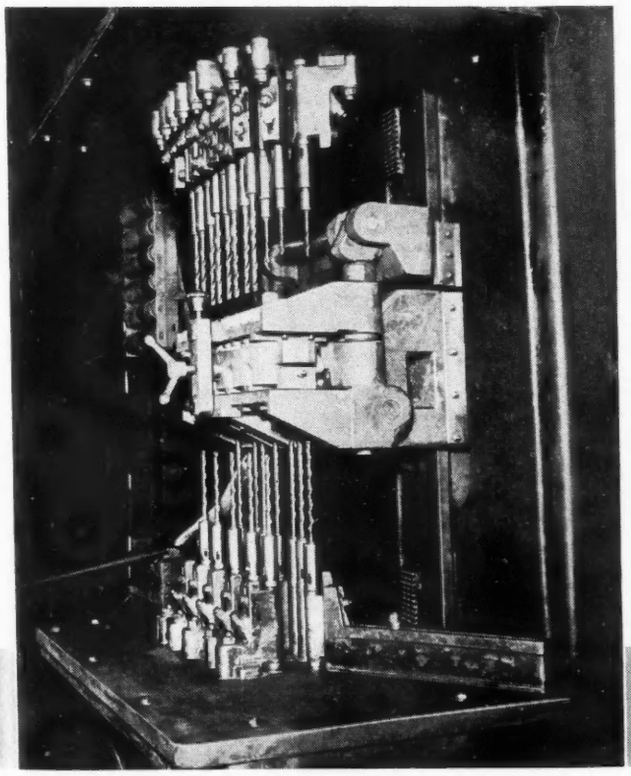
Finally, it may be noted that speedy service to its customers is facilitated by the happy circumstance that its principal supplier of engine castings—the well-known Lakey Foundry—is located but a short distance away, practically on the edge of the property, permitting delivery by industrial trucks such as are used for inter-departmental communication.

Machine Shops

A bird's-eye view of the engine building establishment will make it apparent to the seasoned production executive that here is a unified layout designed to produce parts with good economy, with the minimum of handling, developed about the final assembly line as its focal activity.

Factory Routing Cylinder Barrel

OPERATION	EQUIPMENT
Inspect forging	
Bore hole, turn and face both sides of flange and center and face end	Potter & Johnston turret lathe
Turn outside diameter and turn top end, face and chamfer	Potter & Johnston turret lathe
Form pins and undercut for thread diameter	Fay automatic
Mill thread	Hanson - Whitney thread miller
Wash	
Burr complete	
Inspect	



To facilitate this scheme of operation, the machining of heavy parts such as the cylinder blocks, crankshafts, camshafts, crankcases, is concentrated in the extreme end of the building, progressing forward to the sub-assembly line where the initial skeleton frame is built up, thence to the forward section of the plant where component parts are machined in departments located to one side and at right angles to the final assembly line.

First of the machine lines are a group of five separate lines for cylinder block machining. Each of these features flexible type machinery capable of reasonably rapid changeover from one block to another. Wherever

Bausch multiple-spindle drilling machine is tooled for drilling top and bottom surface of overhead-valve cylinder heads.

Factory Routing Crankshaft

OPERATION	EQUIPMENT
Turn and cheek center bearing	Fay automatic
Rough grind center bearing	Landis grinder
Turn front end	Fay automatic
Face rear end and turn outside diameter	Fay automatic
Cheek, face, and turn rear bearing	Fay automatic
Mill front end	Davis & Thompson mill
Recenter	Sundstrand centering machine
Straighten	No. 4 Greenerd press
Rough grind front bearing	Norton grinder
Rough grind rear bearing	Norton grinder
Rough grind gear fit	Norton grinder
Rough grind pulley fit	Landis grinder
Cheek and turn 1 and 4 pins	Wickes pin lathe
Cheek and turn 2 and 3 pins	Wickes pin lathe
Straighten	No. 4 Greenerd press
Rough grind 1 and 4 pins	Landis grinder
Rough grind 2 and 3 pins	Landis grinder
Straighten	No. 4 Greenerd press
Finish grind center bearing	Norton grinder
Finish grind front bearing and bump thrust	Norton grinder
Finish turn oil throw and undercut rear bearing	Wickes lathe
Finish grind rear bearing	Norton grinder
Finish grind flange diameter	Norton grinder
Finish grind rear face of flange	Norton grinder
Finish grind 1 and 4 pins	Landis grinder
Finish grind 2 and 3 pins	Landis grinder
Finish grind gear fit and bump thrust	Norton grinder
Finish grind pulley fit and bump wall	Norton grinder
Mill thread at rear end	Hanson - Whitney thread mill
Drill hole and counterbore relief in rear end	Cincinnati drill
Mill thread at front end	Hanson - Whitney thread mill
Mill 2—No. 8 Woodruff keyways	Whitney hand miller
Tap drill flange holes	Colburn drill
Countersink bolt holes	Bench
Tap four flange holes	Gaterman tapper
Clean out screw holes	Bench
Straighten	No. 4 Greenerd press
Balance	Continental special fixture
Burr	Bench
Polish pins and bearings	Speed lathe
Inspect	Bench
Oil and pack	

possible, this is accomplished by the use of universal type fixtures which can accommodate the range of blocks routed to the line. In other cases, the fixtures and tooling are designed to be quickly interchangeable to this end.

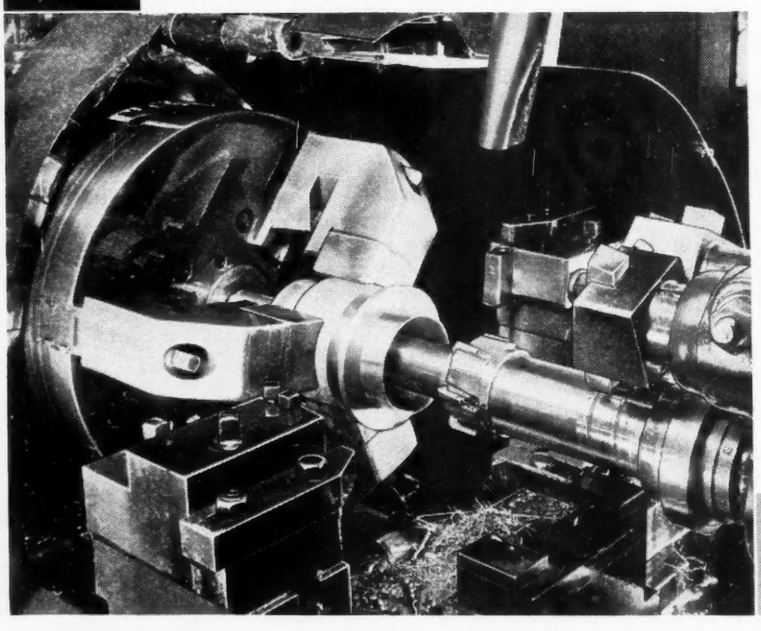
As an example of the flexibility of these lines, it may be noted that one of them handles two basic blocks, each with four optional bores; while another takes one block with two optional bores and one with three optional bores.

The sequence of operations as well as the character of the machine tools on these lines may be appreciated by studying the typical cylinder block routing reproduced elsewhere. This particular line is flexibly tooled for three basic blocks—one having four optional bores, the other two having two optional bores each.

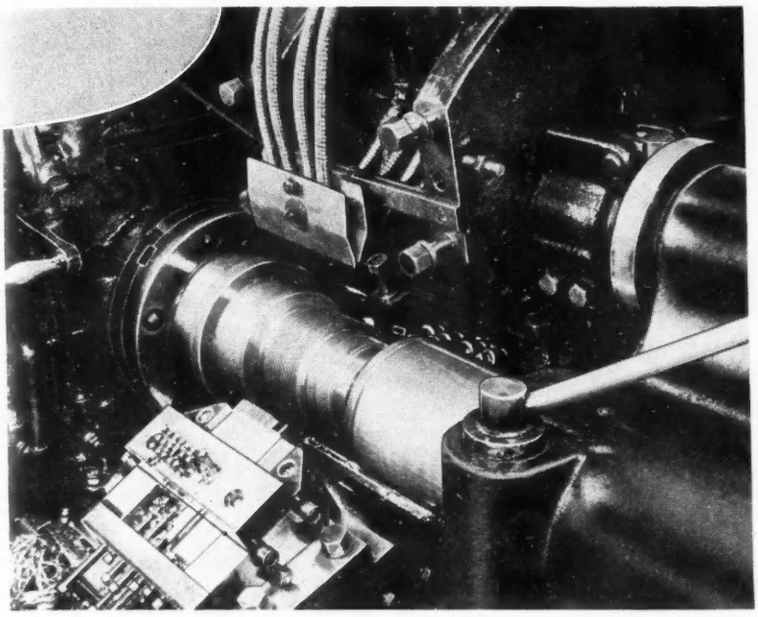
Before leaving the cylinder block department we wish to comment on the fact that most of the large milling cutters used for roughing and finishing cuts on cast iron and for turning flywheels are tipped with Haynes-Stellite J-Metal and with the recently developed Haynes-Stellite 2400 alloy.

In keeping with the manufacturing philosophy mentioned earlier, one of the cylinder block lines has been tooled exclusively for machining a special four-cylinder block for an agricultural tractor engine. This is a high production line, running for some time with a productivity varying from 600 to 900 blocks per week.

Camshafts are machined on one of four separate lines. And it is well worth noting that Continental is equipped to produce both the conventional steel forged camshaft



Potter & Johnston heavy-duty lathe on the aircraft engine cylinder barrel line—boring the hole, turning and facing both sides, in same setting.



Fins are formed on the aircraft engine cylinder barrel on this set-up on a Fay automatic lathe.

Factory Routing Cylinder Sleeve

OPERATION	EQUIPMENT
Mill driving slot	No. 2 Cincinnati miller
Rough bore	Foote-Burt boring mill
Rough turn and face	Fay automatic
Heat treat	
Semi-finish bore and finish bore	Foote-Burt boring mill
Semi-rough turn outside diameter and ends	12 in. LeBlond multiple cutting lathe
Chamfer bottom end of bore	21 in. Cincinnati drill press
Water test	Logan air press
Semi-finish turn groove and straddle face flange	12 in. LeBlond multiple cutting lathe
Finish ream	Foote-Burt boring mill
Diamond bore	Heald automatic boring machine
Chamfer top of bore	21 in. Cincinnati drill
Finish turn outside diameter, straddle face and chamfer, flange	12 in. LeBlond lathe
Finish groove, finish chamfer and form radius	
Finish grind outside diameter	Norton grinder
Lap bores	Hutto multiple lapper
Mill slots	No. 2 Cincinnati miller
Wash	
Inspect	

and the cast shaft which more or less dominates motor car engine usage and is fast growing in acceptance on heavy duty engines wherever quantity warrants it.

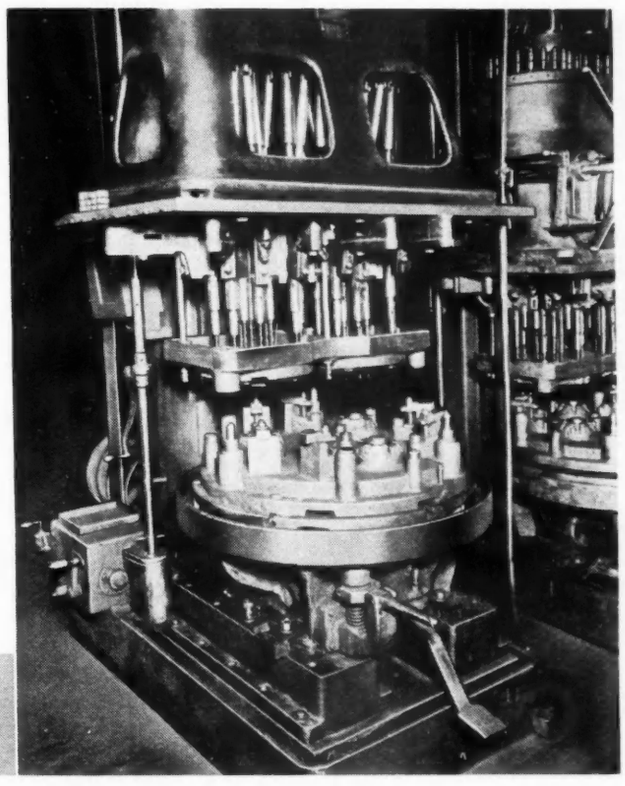
To illustrate the simplicity of machining the cast camshafts, we have reproduced the factory routing giving all of the steps in the process. It will be noted that grinding operations on Norton machines pretty well dominate the picture, save for the initial operations on Fay automatics and several operations on 2-spindle J & L machines. Too, the customary plating and heat treating operations are conspicuous by their absence.

Crankshaft machining, in particular, is distinguished by the flexibility of the equipment as well as the skill with which the basic items of interchangeable tool blocks have been worked out. In this department, Wickes lathes are used exclusively for pin and bearing turnings. They are related to the entire family of crankshafts for production engines and for special customer orders by the system of interchangeable tool blocks which can be installed on any machine. Each of the tool blocks is provided with means for adjustment to any job and capable of accommodating any variety of tools.

Most imposing of the tooling jobs is on a large Wickes lathe. It can take as many as 23 tools in a single setting and has a range of adjustment encompassing eight different shafts.

Flexibility in its best sense also is illustrated by the case of the crankshaft oil hole drilling machine. It consists of a large special bed on which are mounted a number of Leland-Gifford sensitive drilling heads. Each of the heads can be moved to positions along the bed and each one is pivoted so as to match the angularity of any desired oil hole location.

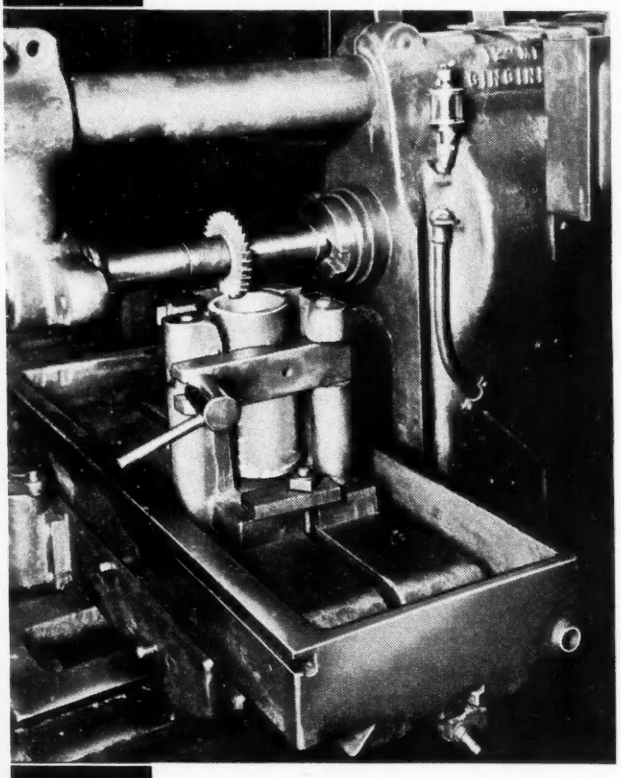
This department, too, boasts what may be termed a single-purpose machine line. It is used exclusively for a group of four different 4-cylinder cranks and its



One of a battery of Natco multiple-spindle drilling machines on the flywheel machine line. This one is set-up to drill and ream bolt holes, drill and counterbore screw holes.

Executive Personnel

W. R. Angell, Sr... President-Treasurer
Jack Reese ..... Vice President and General Manager
L. P. Kalb ..... Vice President Engineering & Manufacturing
B. F. Tobin ..... Vice President in charge of Sales
H. W. Vandeven... Ass't Treasurer
W. R. Angell, Jr... Ass't Secretary-Manager Aircraft Sales & Service
Lloyd Rich ..... Factory Superintendent—Aircraft
Guy Harinton ..... Factory Superintendent—Agricultural—Industrial—Marine & Truck Engine Division
George Winters ... Purchasing & Planning—Agricultural—Industrial—Marine & Truck Engine Division
M. R. Ramsey .... Purchasing Agent—Aircraft
E. Kring ..... Division Superintendent
J. Weir ..... Division Superintendent
W. Hietanen ..... Master Mechanic—Aircraft
H. P. Johnson ..... Master Mechanic—Agricultural—Industrial—Marine & Truck Engine Division
W. Odell ..... Superintendent Shop Operations Quality
Henry Modhlman.. Methods Supervisor



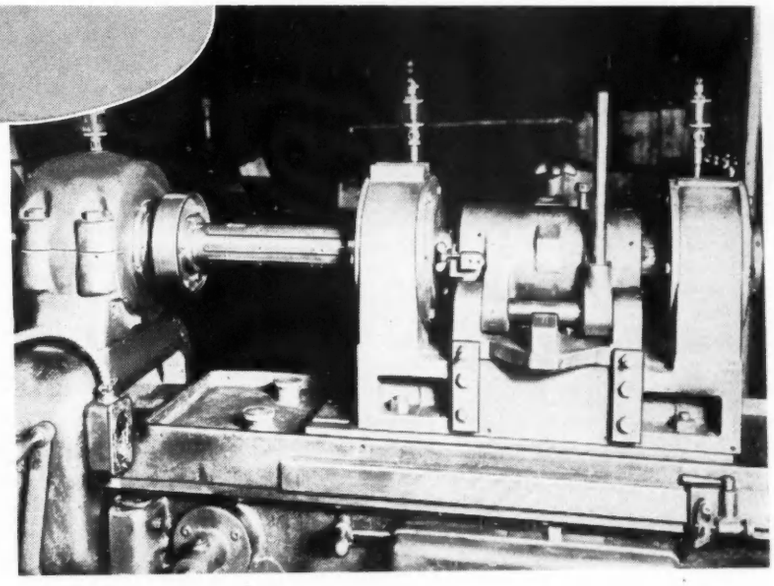
No. 2 Cincinnati milling machine is used for cutting the driving slot in the skirt of the cylinder sleeve.

distinguishing feature is the use of Fay automatic lathes for a number of the initial turning operations. The layout differs so much from conventional practice that we have reproduced the factory routing so as to show the detail of operations. Among the more conventional machines listed on this routing are Wickes lathes, Landis and Norton grinders.

Among the factory routings reproduced in this article will be found a description of a tight department for machining cylinder liners for one of the big overhead valve engines. This is tooled for just one size of liner, using the familiar types of equipment noted on the routing. Note particularly the number of operations imposed on the bore to assure roundness, aline-

Factory Routing Cylinder Head (Overhead Valve)

OPERATION	EQUIPMENT
Rough inspect	Bench
Mill top side	Ingersoll rotary miller
Mill bottom side	Ingersoll rotary miller
Mill manifold side	Ingersoll rotary miller
Drill top and bottom	Bausch drill
Drill both sides	Bausch drill
Rough bore throat openings	Foote-Burt boring mill
Drill valve stem guide boles	Foote-Burt drill
Semi-finish ream valve stem guide hole	Foote-Burt drill
Taper bore throat openings	Foote-Burt drill
Touch spotface valve openings	24 in. Cincinnati drill
Finish ream valve stem guide holes	No. 3 Avey drill
Counterbore spark plug pockets	Foote-Burt drill
Bore and ream 3 core support holes	Cincinnati drill
Tap exhaust side, drill and tap pipe and drill hole through	Radial drill
Tap spark plug holes	Fox tapper
Tap top side	Radial drill
Assemble core support hole plugs	Bench
Water test	Special Fixture
Press in valve stem guides	Metalwood press
Ream valve stem guides after assembled	Avey drill
Finish taper bore throat openings and rough seat valve seats	21 in. Cincinnati drill
Wash and clean out wires	
Inspect	



Cylinder sleeves are diamond-bored on this Heald Automatic boring machine.

ment, and conformity to size. The bore is rough-bored before heat treatment; semi-finish and finish bored after heat treatment. Then diamond-bored on a Heald precision boring machine, followed by honing on a Hutto multiple honing machine which takes eight sleeves at a time. It is evident from the routing that steps have been taken to assure the alinement both of bore and outside diameter by closely related operation.

Perhaps the only other major department in this section of the plant is a group of three lines for the production of the gamut of bearing caps required for the multiplicity of engines built by this company.

The foregoing departments feed the sub-assembly line, so-called, which serves as the link with the final assembly line and its self-contained departments. Function of the sub-assembly line is to build up the structural elements of an engine—the cylinder block, crankshaft, camshaft, main bearing caps—thus facilitating the assembly operations on the final line.

Final Assembly Department

Final assembly, a power conveyor line some 750 ft. in length, dominates the major section of the plant in every respect. The scheduling of this line naturally sets the pace and defines the activity in each of the related machine shop departments that serve it.

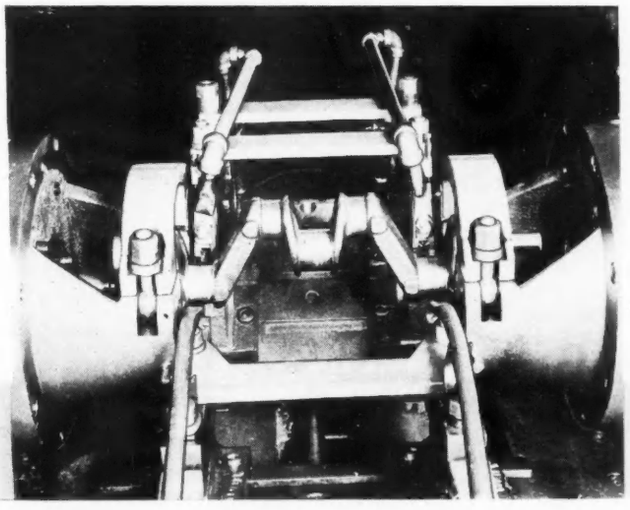
Machine shop departments, consisting of parallel lines at right angles to the conveyor, are arranged in approximately the sequence in which component parts are required for motor assembly. These departments may be high-spotted as follows: pistons, connecting rods, cylinder heads, flywheel housings, flywheels, timing gears, miscellaneous gears, oil pump parts and assemblies, accessories, manifolds, water pump, gear cover, miscellaneous parts.

The connecting rod department contains four different lines. One of these is a high production line; an-

(*Turn to page* 511, *please*)

Factory Routing Camshaft (Cast Iron)

OPERATION	EQUIPMENT
Turn rear and center bearing, cut groove, cut off and space rear bearing	Fay automatic
Turn front bearings, gear fit and cut grooves in center of front bearing	Fay automatic
Break corners on bearing	Speed lathe
Rough grind gear fit	Norton grinder
Rough grind rear bearing	Norton grinder
Drill hole (half length of draft)	2-spindle Pratt & Whitney gun drill
Drill hole (second half of shaft)	2-spindle Pratt & Whitney gun drill
Drill, ream and recenter front end	2-spindle Jones & Lamson
Drill and chamfer 2 holes	2-spindle Jones & Lamson
Mill keyway	Whitney hand miller
Drill seven holes	Leland-Gifford speed drill
Drill pin hole	Leland-Gifford speed drill
Countersink 2 holes at rear end	Leland-Gifford speed drill
Check for straightness	Bench
Finish grind rear bearing	Norton grinder
Finish grind center bearing	Norton grinder
Finish grind front bearing	Norton grinder
Finish grind gear diameter	Norton grinder
Rough grind cams	Norton grinder
Finish grind cams	Norton grinder
Straighten	Bench
Wash and clean out oil holes	Bench
Inspect	Bench
Oil and pack	Bench



Cheeking and turning No. 1 and No. 4 pins on the small four-cylinder crankshaft is done on a Wickes lathe.

How Much Room Down South?

(*Continued from page* 470)

Raw Materials	Value in Arg. Pesos
Chassis and bodies	42.771.495
Tires and tubes	2.901.505
Spare parts & accessories	566.582
Steel; semi-manufactured goods	413.252*
Timber	553.120
Glass	106.940
Leather & cloth	131.119
Paints & Varnish	525.829
Screws and sim.	61.124
Sundries	622.870

* 1495 tons.

The total value of raw materials, about 48.7 millions of pesos, is contrasted with the value of 56.7 millions of cars and trucks assembled and bodies built; 49.3 millions being the value of the cars and trucks, 5 millions that of bodies, whereas, 2.4 millions are estimated as the value of repair work undertaken.

The future of the automobile in the Argentine depends on a multitude of factors. The most important item is, of course, the extent to which Argentina will benefit from the hostilities in Europe. When the war broke out, the Argentine government had on hand a stock of about 3 million tons of wheat which it had bought from the farmers at prices far above the world market quotations. A large part of this stock has already been disposed of at higher prices. It remains to be seen, however, whether wheat prices will increase still further. Also rather obscure is the outlook for meat, as England has so far refused to pay the increased prices asked for by Argentina. A prolonged war would probably increase greatly Argentina's purchasing power, and would create an increased demand for passenger cars as well as for trucks.

It is not yet known, however, whether the Argentine government, or to be more precise, the Foreign Exchange Control Office which has to tender the corresponding import permit, would allow high automobile imports. For the time being, they are considered as luxury, and import permits are only tendered valid for the purchase of dollars at 422.89 (pesos/dollars) whereas the preference rate is only 373.13. Furthermore, as long as the commercial treaty between the United States and Argentina has not been concluded, import permits for British cars will be easier to obtain than those for American cars. At the beginning of this year American imports were drastically curtailed, and the British Commercial Attaché urged British factories to pay more attention to Argentina's needs as the existing "chances may not recur." There is no doubt that, apart from the British (and German) branch offices of General Motors and Ford (Vauxhall and Opel-Eifel), British automobile manufacturers have been able to increase their Argentine sales. The individual importers of British cars have also advised the public that, in spite of the war, shipments of British cars and parts would not be interrupted and that prices would be kept low. The British Export Credit Insurance scheme will also continue to work.

TABLE II

UNITS, (Unless otherwise stated)	Import-Duties 1938(x) Arg. Pesos	Imports 1938	Imports 1937	U. S. Imports 1937
PASSENGER CARS				
up to 1000 kg.	363,77	2966	2133	516 (1)
1000 to 1500 kg.	603,73	33119	26867	25676
1500 to 1900 kg.	904,91	1564	1516	1456
1900 kg. and up	2086,25	260	177	141
"de luxe" under 1900 kg.	1842,40	14	29	23
BUSES	304,16	48	5	4
TRUNKS	280,25	5952	2336	2262
CHASSIS				
for pass.-cars up to 1000 kg.	204,59	2	1	.....(2)
100 to 1500 kg.	565,68	1	8	8
for buses	207,86	206	215	63 (3)
for trucks	179,50	8700	12959	12324
DIESEL ENGINES				
for trucks and buses	158,23	100	151	7 (4)
ACCESSORIES AND SPARE PARTS (Tons)	37 and 47% ad valorem	3107,6	3576,5	3190,3

(x)—For buses and trucks and chassis for both, the duties are for parts to be assembled in the Argentine. Trucks are duty-free in certain cases.
(2)—From England.
(3)—90 from Sweden; 61 from Germany.
(4)—115 from Germany.

TABLE III

	Import of Tires Tons	Local Tire Production Tons	Passenger Cars in Circulation	Number One Roads (kilometers)
1931	2811	1689	417,266	2000
1932	1954	3933	371,877	2109
1933	1820	3214	322,147	6358
1934	1591	5463	338,384	6458
1935	635	6390	354,621	7231
1936	762	6068	270,858	10472
1937	593	7957	387,095	13963
1938	488	9329	405,088	16566

Finally, Argentina's supply of petroleum is by no means secure. However, petroleum production is rapidly increasing. Having passed the one million cubic meters mark in 1926 and the two million mark in 1932, 1939 might witness the passing of the three million mark, two-thirds of which will be supplied by the National Petroleum Co. (Yacimientos Petroliferos Fiscales) and the remaining third by private companies. Already, under normal conditions, Argentina's petroleum production covers the nation's needs only by two-thirds, roughly one-third being supplied by imports. With the shortage of coal following decreasing British shipments (Argentina has no coal of her own) consumers might switch from coal to oil wherever that may be feasible, whereas new manufacturing plants prospering due to war time conditions, will from the very start prefer oil to coal. It is quite likely that, in order to safeguard the country's oil supply, the government might restrict traffic of passenger cars, including the small "colectivos" (small buses) which have been, so far, the most effective competition to street cars and suburban rail traffic.

Passing now to tractors, figures reflect both restrictions of imports during the first months of the current year and the general uneasiness in the agricul-

tural districts existing during the past 15 months. Tractors pay import duties of 10 per cent *ad valorem;* they can be exempted, however, from duty just as it is possible for certain imports of trucks. Tractors most frequently exempted are those capable of pulling at least 18 times their own weight.

Tractors imported numbered 82 in 1935, 682 in 1936 and 3300 in 1937—those imported from the U. S. alone numbered 62 in 1935, 639 in 1936 and 3231 in 1937. In 1938 5041 tractors were imported, no details being available and only 531 during the first six months of this year as against 3077 from January to June, 1938. It is nearly certain that tractor imports will soar considerably, as Argentina will seize her chance of supplying the belligerents with wheat, corn and linseed.

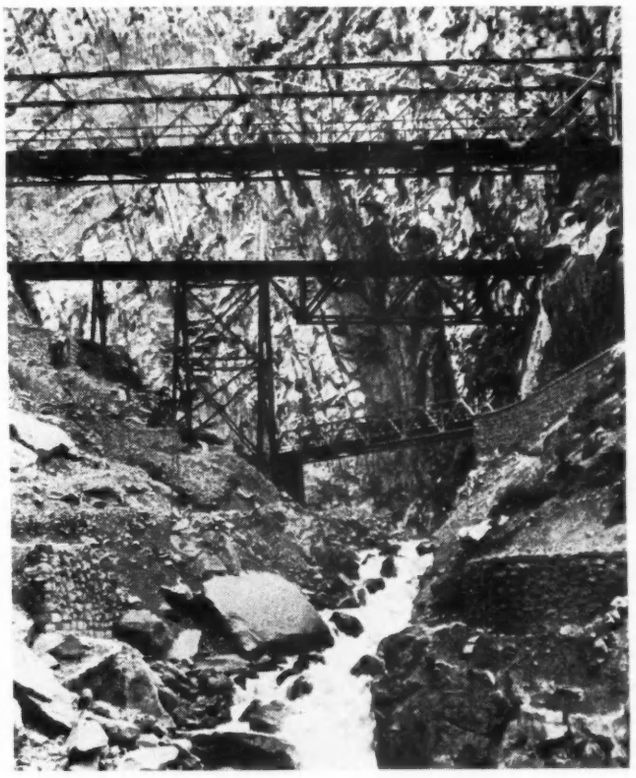
A good idea of vehicle use generally can be formed by comparing the production of pneumatic rubber tires with the number of cars and with the extension of first class roads. Tires and tubes for passenger cars and trucks are made locally by Firestone and Goodyear, and inner tubes only by Pirelli. Development since 1931 is shown in Table III.

For the sake of completeness, it might be mentioned that 185 motorcycles were imported in 1936, 409 in 1937 and 607 in 1938, mostly for use by the authorities. The duty for motorcycles is 32 per cent *ad valorem.* Most important suppliers were England and Germany.

Aviation has made little progress during the past years as all important routes are served by foreign companies which provide their own services. A new Argentine line crossing the La Plata twice daily for Montevideo had some trouble with Italian pilots.

Airplanes are duty free in Argentina, and imports —as far as they concern military purchases—have developed as follows: 1935: 19 units, 10 of which were from the United States; 1936: 18 (nine from the United States; 1937: 41 (16 from the United States, 17 from Canada, three from Germany, two each from England and France); 1938: 13, and 1939 (January to June): 11.

The government's aircraft factory at Cordoba pro-



(Left) Rugged terrain made necessary the construction of numerous bridges and tunnels for the TransAndean highway. Here is a canyon bridge that lifts automobiles up and over an old railroad trestle built years ago by American railroad engineers. (Below) American tractors are used in Peru to dig out the new desert roadbeds. Parts of Peru, cut off from the capitol, are now being linked by a national highway system which will make this country a great new market for American motor vehicles.

duced, in 1938, 44 airplanes (Frocke-Wulf 44J) in addition to 15 engines and 41 propellers. Statistics for the years 1932 to 1936 are as follows:

	1932	1933	1934	1935	1936
Propellers built	28	59	48	35	26
Engines built	..	..	..	..	37
Airplanes built	..	..	..	..	88

Of the engines, 16 were Lorraine-Dietrich of 450 hp. and 21 Wright-Cyclone, R-1820-E.1, of 620 hp. The planes were of the factory's own construction, 67 having Wright-Whirlwind engines, 18 Genet-Major engines of 140 hp. and three Lorraine-Dietrich engines of 450 hp. In addition 25 and 27 propellers had been repaired in 1935 and 1936, respectively, and 193 planes had been rebuilt.

Civil planes of the German (Condor) Line have ceased transoceanic service but continue to fly to Brazil. Air France services to France and Chile were reduced. American services have never been interrupted. The formerly mentioned Argentine Line serves Montevideo, and another, but government-owned, line has extended its services, with Junkers planes, to Patagonia.

For previous discussion of the Argentina export situation, see "U. S. Car Exports to Argentina May Be Doubled Under New Plan"—A. I. issue of June 1, 1939 (p. 675) and "Argentina Concludes Negotiation on Plan to Finance Vehicle Imports"—A. I. issue of July 1, 1939.

Production Lines

No Frame

This time of the year the engineers already have forgotten the '40 models and are busy on the '41 product. While it's too early for an outsider to sense the trend of things that far ahead, we have a feeling that many producers at least are thinking about integral body and frame construction. One chief told us just a few days ago that he is definitely planning on the integral construction for '41. We hope that designers will not overlook the obvious advantages inherent in the adoption of tubular body structural members for this type of design.

Unique Coating

Recent years have seen considerable activity in the redesign of mufflers to combat service failures due to corrosion. Several fine car builders adopted extra heavy gage terne plate; this year, at least, one producer will use lead-coated sheet for the same purpose. We learn now that a prominent parts maker has developed a special process called "Corronizing" which produces a non-porous nickel plate on sheet metal intended for muffler shells. A non-porous nickel coating is quite an achievement and should attract considerable attention.

Chromium Plating

Some few years ago we mentioned the experimental work that had been done in applying "hard" chromium plate on engine cylinder walls and pistons as a means of reducing wear and minimizing the effects of corrosion. We believe that much work along this line has been done in Europe in the interim. It is well known that in this country "hard" chromium plate has been applied with signal success in cylinders and on pistons for racing outboard engines. This activity places an unusual accent on the recent announcement that the Tomkins-Johnson Co., manufacturers of "Rivitors," "Clinchors" and a line of air and hydraulic cylinders, have adopted hard chromium plating for cylinder walls and piston rods. Recent correspondence indicates that this organization has found that "hard" plating has rust-resistant properties that overcome the corrosion and wear so common where compressed air and water are encountered. Their plating problem, naturally, is more simple than in the case of engine blocks, since they use individual steel tubes for the cylinders. Their experience indicates the utility of chromium plating for this purpose and in production they find that the added operation does not add appreciably to the cost of the cyinders. It is worthy of note that the steel tube cylinder bodies are carefully machined and honed before plating, thus providing an excellent foundation for precise size and concentricity as well as for fine surface finish.

Zero Lash

For some time we have had little occasion to mention the hydraulic valve lifter pioneered by Wilcox-Rich. Now we learn that the newly developed "steel" units, longer lived and more effective, have become an integral part of a new giant-powered eight-in-line passenger car engine which will make its bow perhaps even before this item is printed.

Defines Tools

According to *Industrial Standardization*, June, 1939, the job of standardizing terminology of single-point cutting tools has been finally completed. Let ASA publication B5.13-1939 be your guide as to definitions and symbols applicable to single-point tools. No longer will there be confusion as to whether a tool is right-hand or left-hand. Under the new standard, there are "right-cut" and "left-cut" tools, the "right-cut" being one that is fed from right to left, with the cutting edge on the left side.—J. G.

WHITE SIX-CYLINDER

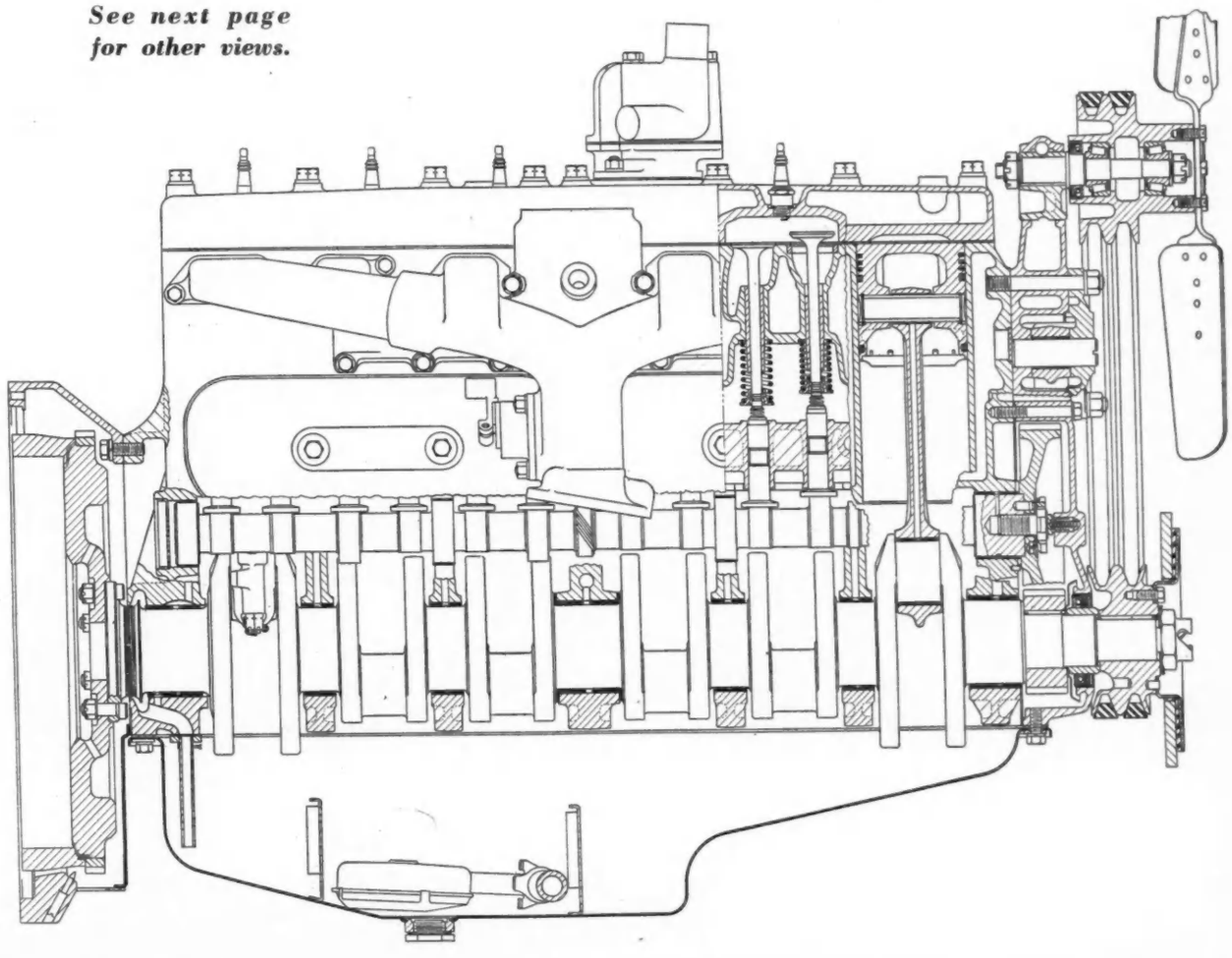
MODEL 20A TRUCK ENGINE

Longitudinal Section

This six-cylinder 3⅞ by 5⅛-in. engine (362 cu. in. displacement) is rated 116 hp. at 3000 r.p.m. and develops a maximum torque of 280 lb-ft. at about 1200 r.p.m Among the features of design are a secure anchoring for the cylinder head bolts, thorough cooling of the valve seats, smooth valve passages, and the use of zero-lash valve tappets. Bearing surfaces of the crankshaft are Tocco-hardened.

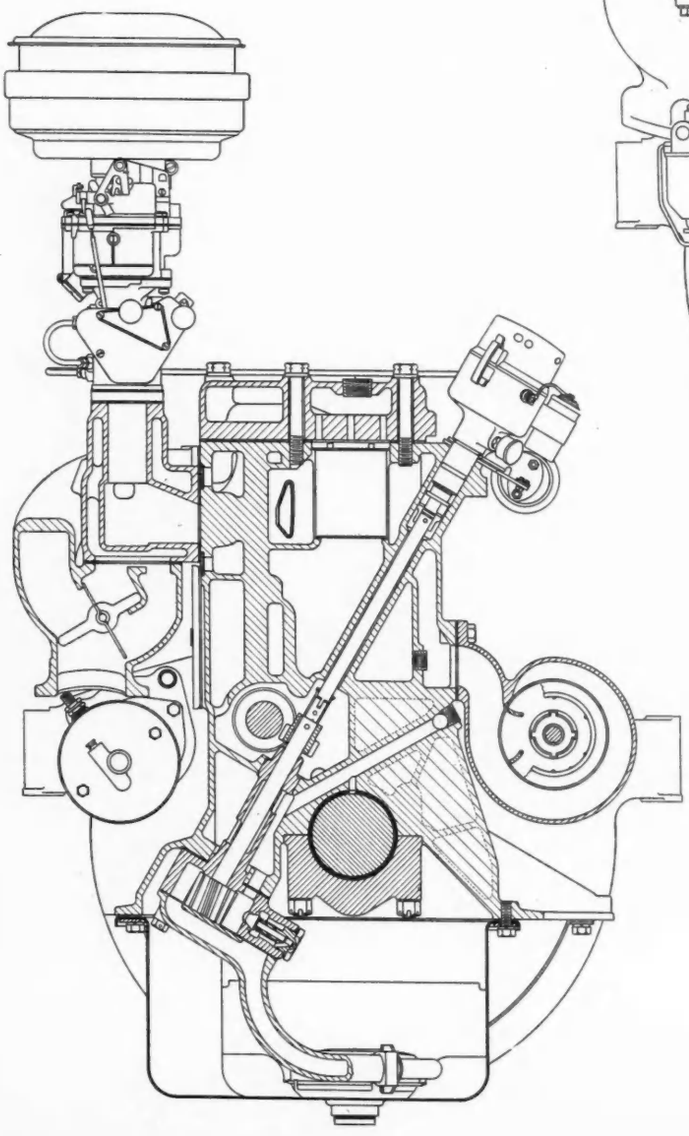
Lubrication is by pressure to all bearings, timing gears and piston pins.

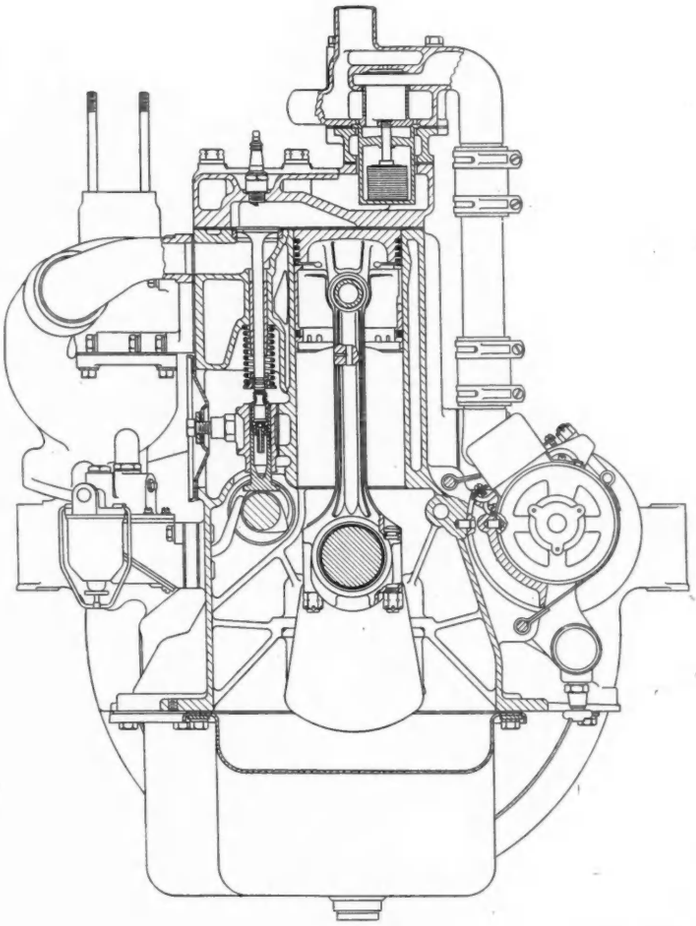
See next page for other views.



WHITE SIX-CYLINDER MODEL 20A TRUCK ENGINE

Transverse Sections





See preceding page for longitudinal section and description.

NEWS OF THE INDUSTRY

Boom Times Have Returned To the Rubber Industry

Factories Operating Near Peak Capacity of 10 Years Ago; Many Former Workers Recalled

The rubber and tire industry is experiencing new boom times with one of the greatest surges upward in business that it has had in a decade. Not only are factories all over the country reported to be recalling men who had been on furloughs, but in many instances, particularly in the Akron area, men who have been laid off for two, three and four years, have been called back and ordered to report immediately to their old departments. In Akron the upward surge is being reflected significantly in retail business, with all phases of business in the city enjoying a remarkable spurt. Mechanical goods departments of Akron rubber factories appear to be the busiest and to be recalling the most men. Factory shifts are being lengthened and factories are operating nearer capacity than for 10 years.

In the tire field the uncertainty of the crude rubber situation, with prices showing an upward curve, has caused manufacturers to apparently delay indefinitely their plans for customary Nov. 1 announcement of the ensuing year's program. A meeting of manufacturers under auspices of the Rubber Manufacturers Association, scheduled for Oct. 23 to map final plans for the industry's annual spring-dating program, was abruptly postponed—and no future date for the meeting has been set. Because of the uncertain price situation, the manufacturers probably will avoid the usual six months freezing of prices under spring dating and instead of starting spring dating Nov. 1, will shorten the program at both ends, possibly not starting it until Dec. 1 and then cutting it down from six months to five or four.

The sudden postponement of the industry meeting may presage a price increase. Mechanical goods prices have been raised from 5 to 10 per cent due to mounting crude rubber prices, but tire manufacturers were anxious to reestablish their list prices which were demoralized by the mid-summer orgy of price cutting, before raising the lists.

Shipping restrictions in the impending neutrality act amendment will disrupt imports of crude rubber to the United States according to a warning sounded by the Maritime Commission in Washington. Manufacturers, however, believe the commission paints an over-dark picture on the theory that most rubber coming to the United States is brought in bottoms other than

(*Turn to page* 510, *please*)

N.S.P.A. Sales Index Inches Up One Per Cent

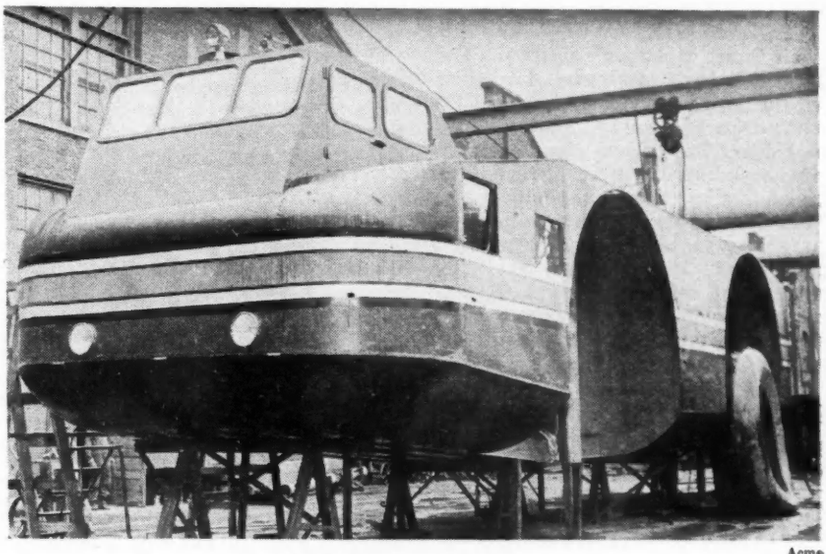
Sales of automotive merchandise in September, according to the index prepared by the National Standard Parts Association, showed an increase of 1 per cent over August. This is 10 per cent above September of last year. Average monthly sales for the first three quarters of this year are 20 per cent above the same period for last year.

The N.S.P.A. reports that replacement parts shipped to wholesalers in September were 2 per cent above August and 9 per cent above September a year ago. The monthly average for nine months is 19 per cent above the first nine months of 1938.

It is further reported by the association that shop equipment and tools shipped to wholesalers in September declined 8 per cent, but this is still 5 per cent ahead of September of last year. Average monthly sales for the first nine months are 12 per cent above the same period last year.

Original equipment shipped to vehicle manufacturers in September showed an increase of 33 per cent above August which places this index 43 per cent above September, 1938. The monthly average for the first three quarters of the year is 46 per cent above last year.

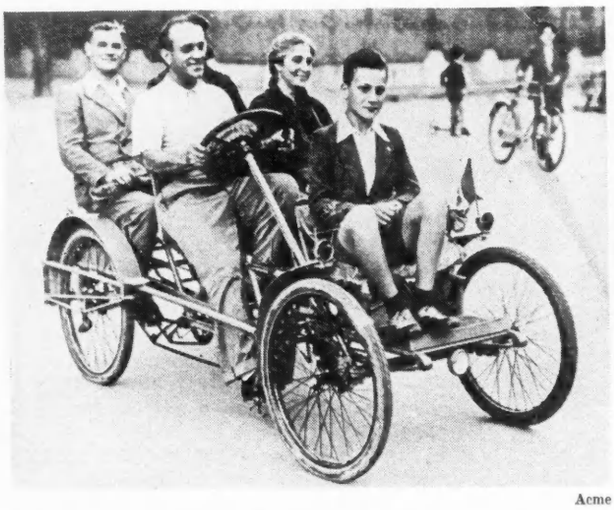
Export shipments in September declined 3 per cent, but this index is still 16 per cent above September, 1938. Export shipments for the first nine months are 11 per cent above the same period of last year.



Acme

Nearing Completion

With the body completed, construction of the Antarctic Snow Cruiser at the Research Foundation of the Armour Institute of Technology, Chicago, nears its end. Little remains to be done beside the fitting of the ten-foot wheels and tires before the craft is ready for the U. S. Antarctic expedition which Admiral Byrd will make this fall. (See "Construction of the Antarctic Snow Cruiser," AUTOMOTIVE INDUSTRIES, Sept. 15, p. 266.)



Acme

Pedomobile

This vehicle appeared on the streets of Milan, Italy, shortly after gasoline-rationing regulations went into effect. The "Pedomobile," as it is called, is powered by the foot work of its driver who may be assisted by one of the rear passengers.

NLRB Orders Election Among Pattern Makers at Goodrich

Ourselves and Government—A Check List Of Federal Action Corrected to October 20

NATIONAL LABOR RELATIONS BOARD

Board in majority decision written by Chairman Madden and concurred in by Member Leiserson, on Oct. 19 ordered an election within 30 days among pattern makers and their apprentices employed by B. F. Goodrich Co., Akron, Ohio. These employes will vote whether they desire AFL's Pattern Makers League of North America or CIO's Goodrich Local No. 5, United Rubber Workers of America.

LABOR DEPARTMENT

STEEL WAGE CASE—Since the Circuit Court of Appeals upset the Secretary of Labor's steel wage determination, the War, Navy and Treasury Departments are disturbed that prospective bidders have been given unprecedented standing in court and that if the decision is allowed to stand bidders may be able to tie up a whole purchasing program by protesting in court, for example, that specifications are "too stringent." They plan to participate in the Labor Department's expected appeal to the Supreme Court. (See story on page 504.)

FEDERAL TRADE COMMISSION

F.O.B. PRICE CASE — Testimony closed in GM case, with trial examiners report having been served on respondent company. After final arguments, the FTC order is next in line. Trial examiners report still due in Ford case. Both cases involve the FTC allegation that the companies engaged in misleading price advertising.

VS. GENERAL MOTORS—Trial examiners report due. Rebuttal testimony concluded Sept. 11. The FTC charge is that GM dealers are required to handle GM parts exclusively.

SIX PER CENT CASE—Final arguments completed in both Ford and GM cases involving the Commission allegation that companies engaged in misleading representation in finance plan advertising. Cease and desist orders may be next development.

FAIR TRADE PRACTICE RULES —No indication when rules, now long overdue, will be promulgated.

British Rubber Publicity Assn. Changes Address

The British Rubber Publicity Association announces a change of address to 1 Albert Mansions, Lansdowne Road, Croydon, Surrey, England.

Automotive Men Speak at U. of M.-Life Conference

Scientists, research men and technicians from industrial corporation laboratories, governmental bureaus, research foundations and technical schools gather at Ann Arbor, Mich., on our date of issue—Nov. 1, for the "University of Michigan-Life Magazine Conference on New Technologies in Transportation." Speakers at the session include: C. F. Kettering, vice-president in charge of research, General Motors Research Corp.; C. R. Smith, president, United Air Lines; F. M. Zeder, vice-chairman of the board, Chrysler Corp.; Dr. R. M. Wick, research engineer, Bethlehem Steel Co.; D. A. Wallace, president, Chrysler Sales Corp.

Sponsored jointly by the university and Life magazine, the conference is described as "designed to examine new methods, new materials, and new directions in the transportation field," dealing with aspects of engineering, metallurgy, thermo-dynamics, structure, tensile strength, speed and capacity.

MEN . . . . . .

Frank T. Gerow has been appointed branch manager of the Toronto Branch of the White Co., Ltd. of Canada.

R. B. Nichols has been named secretary of the Bantam Bearings Corp., South Bend, Ind., subsidiary of the Torrington Co., Torrington, Conn. Mr. Nichols, in addition to his new duties, will continue as sales manager.

Paul F. Jones, formerly in charge of the Chicago and Kansas City districts for the Willard Storage Battery Co., has been added to the battery sales department of the Goodyear Tire & Rubber Co., as special representative.

E. W. Stock has been appointed director of service for Fruehauf Trailer Co.; for the past eight years he has been general service manager of White Motor Co.

The eightieth birthday of **Frank A. Seiberling,** dean of the rubber industry, was celebrated recently with an 80th Anniversary Ball in his honor at Akron. Employes of the Seiberling Rubber Co., of which he is now chairman of the board of directors, presented him with a bronze plaque.

The following men have been elected as officers of the Brake Lining Manufacturers' Association: President — **R. B. Davis,** Raybestos division of Raybestos-Manhattan, Inc.; first vice-president—**T. L. Gatke,** Gatke Corp.; second vice-president—**A. C. Teetsel,** Ferodo and Asbestos, Inc.; treasurer—**J. S. Crawford,** Johns-Manville Corp.; secretary, general manager and assistant treasurer—**C. A. Ekwall.** The following were elected additional members of the executive committee: **F. E. Schluter,** Thermoid Co.; **H. A. Gillies,** American Brakeblok division of American Brake and Shoe Fdry. Co.; **G. M. Williams,** Russell Manufacturing Co.; **C. P. Brockway,** World Bestos Corp.; **F. I. Marshall,** Marshall-Eclipse division of Bendix Aviation Corp.

H. E. Ankeney has been appointed to take charge of the Indianapolis territory for Cutler-Hammer, Inc. He was formerly with the Chicago office.

Ralph L. Switzer, experimental engineer for the Wisconsin Motors Corp., Milwaukee, Wis., has returned to this country following a seven-weeks stay in England. Mr. Switzer had gone to England to straighten out production at R. A. Lister & Co., of London, which

bought parts for some 5000 engines from the Milwaukee concern.

D. E. Gamble, of Chicago, has been named president of the Pump Engineering Service Corp. of Cleveland, Ohio, a subsidiary of Borg-Warner Corp. Mr. Gamble for 11 years has been vice-president and general manager of the Borg & Beck division of Chicago, manufacturers of automotive clutches. **Ralph H. McOuat** will continue as general manager and has been elected vice-president of Pump Engineering Service Corp.

C. W. Hedler and **R. L. Miller,** both long-time members of the general sales staff of the Norma-Hoffmann Bearings Corp., Stamford, Conn., have been named assistant managers.

Ira S. Snead has been appointed vice-president in charge of the bus division of the White Motor Co. **J. A. Kiggen, Jr.,** has been appointed eastern regional manager for coach activities and will have his headquarters in New York City.

John W. Young has been elected president and general manager of the Hayes Body Corp., Grand Rapids, Mich.

F. G. Collura has been appointed eastern design director for Designers for Industry, Inc.

W. L. Clark, vice-president and general sales manager of J. I. Case Co., has been elected president of the Farm Equipment Institute.

A. W. Wild has been made manager of the aircraft division of Continental Motors Corp. Other new appointments in the same division are: **D. H. Hollowell,** who has been named sales manager, and **J. B. Fornaser,** who has been appointed sales engineer. **R. D. Hicks** continues as service manager of the aircraft division, and **W. B. Powell** remains his assistant.

H. P. Thornton of the White Motor Co. and **Eugene C. Hoelzle** of the Packard Motor Car Co. have been elected to the Controllers Institute of America and will represent respectively the motor truck and passenger car industries.

Automotive Industries

Summary of Automotive Production Activity

BUSES Manufacturing operations in the plants of several large producers are averaging around the 60 per cent capacity mark. Inquiries indicating considerable interest in automatic transmissions for buses are reported by a number of distributors in the East.

TRUCKS Production and sales are well ahead of 1938. Due to jumbled national and international conditions prevailing, truck makers are reluctant to predict the outlook even for the near future.

TRACTORS Prominent voices in this field state that 1939 is not as good as the previous year. However, there seems to be a tendency to buy before prices are higher and some quarters express belief that this will be more pronounced through November and December. Manufacturers have their fingers crossed as to the future.

AUTOMOBILES Output in the final weeks of October showed little gain over the volume achieved by the industry in the early part of the month due to severe strike interruptions. Production for the weeks ended Oct. 21 and Oct. 28, respectively, is estimated at 70,000 and 75,000 cars and trucks.

MARINE ENGINES Although the seasonal dull period is being felt throughout the industry, government requirements are keeping production levels up.

AIRCRAFT ENGINES Production continues at a high level. Several plants have added manufacturing machinery, and new plants and additions have been built or are underway.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

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Graham-Paige Offers Two Lines for 1940

Master Line on 120-in. Wheelbase Is Refinement of 1939 Design; Companion Line Has 115-in. Wheelbase

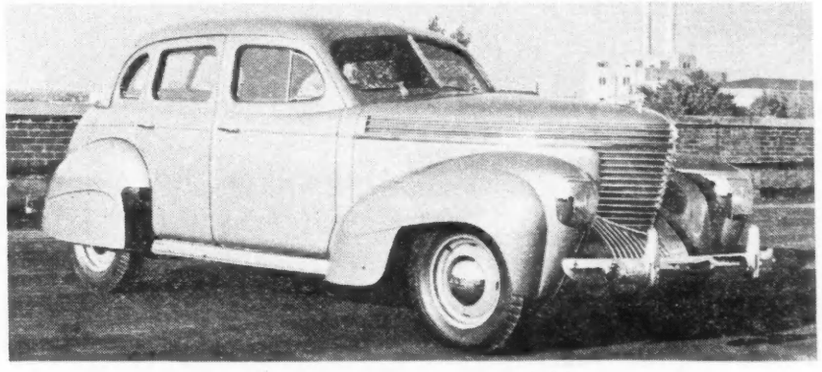
Two separate lines of cars will be offered by Graham-Paige for 1940—the Master line on 120-in. wheelbase which is a continuation of last year's design, and a companion line of low-slung, racy appearance, on a wheelbase of 115 in. This dual line is intended to fit in the medium and lower priced fields. On the Master line the Detroit delivered prices range from $965 for the DeLuxe two-door sedan to $1,265.

The Master line will be a continuation of last year's model with improvements in interior and exterior treatment. It will feature four models—the DeLuxe, DeLuxe Supercharger, the Custom, and the Custom Supercharger. In addition to the two-door sedan, the four-door sedan, and the combination coupe, Graham has added a five-passenger convertible coupe.

Many of the features which were available at extra cost on the 1939 models are standard equipment for 1940. Included as standard equipment are such items as remote control gear shift mounted on the steering column, metal spring covers, rear wheel shields, dual horns, dual tail lights, colored fenders and sheet metal lacquered to match body color.

Mechanically, and in major styling features, the Master line is carried on unchanged, except for some changes in the powerplant designed to effect an increase in output. The engine remains essentially the same, six-cylinder, L-head, 3¼ in. bore by 4⅜ in. stroke, 218 cu. in displacement. However, the output of the engine without supercharger has been increased to 92 hp. at 3800 r.p.m., an increase of two horsepower, while the output of the supercharged engine has been increased to 120 hp., at 4000 r.p.m., up four horsepower.

The new companion line will comprise two models—the Graham Clipper and the Graham Hollywood, each available in a four-door sedan and a five-passenger convertible. The Clipper will be powered with a Graham-built engine without supercharger. The Hollywood will have a Graham-built engine, with supercharger. In addition, this model will be equipped with super-deluxe trim and accessories.



Graham-Paige for 1940

The four-door sedan of the Master Line which Graham-Paige offers for 1940 on a 120-in. wheelbase. Many features, which were available at extra cost on 1939 models, have been made standard equipment.

Business in Brief

***Written by the Guaranty Trust Co., New York, Exclusively for* AUTOMOTIVE INDUSTRIES**

Moderated expansion of general business activity has continued. *The New York Times* seasonally adjusted index rose from 101.1 per cent of estimated normal to 102.7 during the fortnight ended Oct. 7. *The Journal of Commerce* unadjusted index advanced 3.5 points in the same period to 108.1 per cent of the 1927-29 average.

Retail sales in the first fortnight of October ranged, according to Dun & Bradstreet estimates, from 8 to 13 per cent above corresponding 1938 levels.

Production of electricity by the power and light industry during the second week of this month reached an all-time peak, one per cent above the preceding record established in the final week of September and 14.3 per cent above the output a year ago.

Railway freight movement during the first week of October established a 1939 record, with 834,694 cars loaded, a nine-year seasonal peak, as against 814,828 cars two weeks earlier.

Bank debits to individual accounts in leading cities during the week ended Oct. 11 fell 8 per cent below the total a fortnight earlier but were 5 per cent greater than in the corresponding period last year.

Crude oil production during the week ended Oct. 14 averaged 3,713,800 barrels daily, as compared with 3,435,850 barrels in the preceding week and 3,658,200 barrels in the final week of September. Daily requirements this month, as computed by the Bureau of Mines, are 3,590,300 barrels.

Bituminous coal production averaged 1,692,000 tons daily during the first week of this month, as compared with 1,650,000 tons for the week before and 1,533,000 tons a fortnight earlier.

Consumption of rayon yarn and staple fibre during the first nine months of 1939 totaled 326,700,000 lb., as compared with 327,200,000 lb. during all of last year.

Cotton-mill activity increased more than seasonally in the week ended Oct. 7, *The New York Times* index standing at 140.2, as against 134.3 a fortnight earlier and 108.9 a year ago.

Professor Fisher's index of wholesale commodity prices for the second week of this month stands at 83.3 per cent of the 1926 average, as compared with the year's peak to date of 83.6 reached a fortnight earlier.

Excess reserves of the member banks of the Federal Reserve system rose $70,000,000 in the fortnight ended Oct. 11 to an estimated total of $5,400,000,000, a new peak. Business loans of the reporting members increased $59,000,000,000 in the same period to a total of $4,288,000,000, or $371,000,000 more than the corresponding amount last year.

Wage Decision "Disturbs" War, Navy and Procurement Officials

See Possibility That Some Government Bidders May Balk at Rigid Requirements and Hinder Purchasing

Officials of the Treasury's Procurement Division and the War and Navy Departments, who have long considered the Walsh-Healey Public Contracts Acts as imposing upon Government contractors restrictions undesirable from an administrative point of view, are nevertheless concerned over the decision of the Circuit Court of Appeals of the District of Columbia in the steel wage case. The language of the court in raking Secretary of Labor Perkins over the coals for her "arbitrary and unwarranted" action in the steel wage determination was not displeasing to them but the fact that prospective bidders were recognized as having standing in court is the thing that is said to be most perturbing to Government purchasing officers.

The big three in the field of Government purchase—Procurement, War and Navy—are fearful that the decision, if upheld by the Supreme Court, may mean a series of headaches for purchasing officers because of the possibility that it gives new status to those who heretofore have been regarded as not having any standing in court. The danger, according to these observations, lies in the likelihood that under the ruling government bidders if they protest against rigid specifications or other requirements which they consider to be unfair or unduly restrictive, may come into court seeking relief and tie up an entire purchasing program.

It is argued that to establish such a precedent at this time when purchases for national defense requirements are soaring would be to seriously retard purchasing activity by court injunctions, with which the Government seldom has had to contend before.

Under the Walsh-Healey Public Contracts Act, the Secretary of Labor is empowered to fix minimum wages to be paid by firms doing business with the Government. When wages were determined for the steel industry, seven small independent steel mills in the East challenged the authority of the Labor Department, protesting that in grouping 13 states in one "locality" for the purpose of fixing minimum wages the Secretary of Labor had exceeded her authority. They were successful in obtaining a temporary restraining order and their contention was subsequently upheld in every particular by the Court of Appeals.

A minority decision, however, written by Associate Justice Henry White Edgerton, said that suits like the steel wage action "operate to disturb the whole contracting system of the Government." His opinion probably comes close to reflecting why the Government's purchasing agents are worrying about the majority decision.

Machine Tool Index Now Being Revised

Recent conditions in the machine tool industry have emphasized the difficulty of determining what may be regarded at this time as firm orders for the purpose of the industry's index of new business. In view of this the National Machine Tool Builders' Association is engaged in constructing a revised index that may more nearly reflect the activity within the industry. The new data may be available within a month or two.

Indications are that in September both domestic and foreign volume show some increase over August, but the uncertainty as to firm character of pending export business necessarily qualifies what may be regarded as the actual volume of firm orders.

Visiting Russian Engineers Barred from Ford Plants

Russian engineers who have been studying production methods in the plants of the Ford Motor Co. over a period of years have had plant visiting privileges withdrawn and no longer will be given free access to the plants, the company has announced.

Specific reasons for the action were not made public but an official of the company indicated that the engineers "had local Communist Party connections and had abused their privileges." Russian engineers began visiting the Ford plant shortly after their government began buying automobile parts in America in 1928. Plants were built in Russia and men were sent to the United States to study American production methods. About 40 men were assigned to the Ford plant and while the personnel of the group changed from time to time the number usually remained at that level. The men were not employed by the company but enjoyed the status of visitors. Although an office of The Autostory, automotive division of the Amtorg Corp., was established near the Rouge plant the company has sold no parts to Russia for some time, it was indicated.

Automobile Manufacturers Pass Resolution Against War

The Automobile Manufacturers Association by action of its directors on Oct. 17 declared itself unreservedly opposed to participation by the United States in the present European war. The resolution also stated the belief that the preservation of the country's freedom of speech, of religious belief, and of opportunity is the most important task facing all Americans today.

Federal Motor Truck Announces 1940 Line

The Federal Motor Truck Co.'s 1940 offerings, in addition to a complete line of conventional models from ¾ to 8 ton, include a group of cab-over-engine trucks from 1½ to 5½ ton, a series of 13 six-wheelers with ratings from 2 to 8 ton and also several models built for specialized delivery service.

The ¾-ton Federals are offered in four- and six-cylinder models. There are four wheelbase lengths: 102 in., 111 in., 119 in. and 128 in. Axles are Timken, the rear being of the full floating type. Other important mechanical features include a 6-in. frame, 10-in. clutch and three-speed synchro-mesh truck transmission, rubber bushed spring eyes and shackles, extra-large Lockheed hydraulic brakes and cast steel spoke wheels.

Conventional models from 1½ to 5½ tons in size and the cab-over-engine trucks within this capacity range are of the same general specifications the only difference being in the front end construction. The Hercules six-cylinder, seven-bearing truck engines vary in size and power with each model. All models are equipped with four-speed transmissions except those with ratings of 3-5 ton and 3-5½ ton which have five-speed transmissions. Brake equipment includes vacuum boosters on all models carrying 2-3½ ton ratings and over. Other features common to this entire group of models are deep fish-belly type frame, Timken front and Timken bevel drive rear axles, roller bearing universal joints, fore-shackled front springs, rubber bushed spring eyes and shackles, cast steel wheels. Two-speed rear axles are optional.

On the super heavy duty models, ranging from 6 to 8 ton capacity, there is a choice of seven wheelbase lengths from 141 in. to 211 in. Models 62 and 65 are powered with a Continental 22RF six-cylinder valve-in-head engine which develops 139 hp. Models 63 and 66 are equipped with a 6SRKF Waukesha six-cylinder engine developing 133 hp.

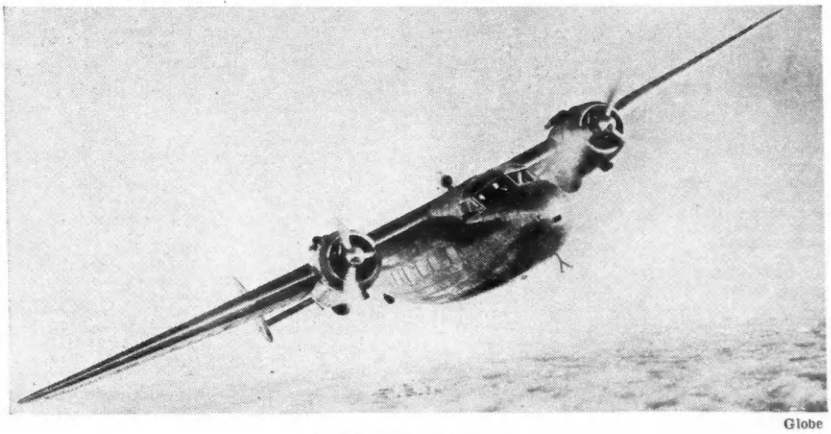
Axles front and rear are Timken. Rear axles are of the double reduction type No. 76746W being used on models 62 and 63 and No. 79733W on the 65 and 66 models. All of these models have a Clark 326VO overdrive five-speed transmission. Westinghouse air brakes are standard equipment. Additional features incorporated in the super heavy duty models are 10 3/16 in. deep pressed steel frame, 14-in. W. C. Lipe single dry plate clutch, roller bearing universal joints, radius rods, 50 gal. side-mounted gas tank with outside filler.

Six-wheelers include conventional and cab-over-engine types with single or tandem drive. Timken rear end units are employed on all of the six-wheel models.

Car Registrations and Estimated Dollar Volume by Retail Price Classes

	AUGUST, 1939		FIRST EIGHT MONTHS, 1939			
	Units	Dollar Volume	Units	Per Cent of Total	Dollar Volume	Per Cent of Total
Chevrolet, Ford and Plymouth	102,797	$75,000,000	1,016,066	48.80	$743,600,000	48.30
Others under $1,000	62,362	56,600,000	641,735	36.82	587,900,000	38.19
$1,001 to $1,500	14,120	16,300,000	134,935	10.61	157,000,000	10.20
$1,501 to $2,000	2,375	3,600,000	18,452	2.34	28,300,000	1.84
$2,001 to $3,000	900	2,000,000	8,692	1.30	19,800,000	1.29
$3,001 and over	44	200,000	587	.13	2,700,000	.18
Total	182,598	$153,700,000	1,820,467	100.00	$1,539,300,000	100.00
Miscellaneous	35	.....	576			
Total	182,633	$153,700,000	1,821,043			

[1] All calculations are based on delivered price at factory of five-passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes are then consolidated by price classes.



Globe

Britain's Latest

This is one of the newest British streamlined planes. Known as the Flamingo, the craft was built by the De Havilland Co. Aim of the designers in producing the Flamingo was to achieve in air transport a routine comparable with current practice in the maintenance of truck and bus fleets.

An engine unit complete with its oil system can be changed in a couple of hours. Port and starboard engines, with installation and cowling, are interchangeable—their accessories and connections are identical. Fuel tanks, oil tanks, tailplane halves, fins, rudders, undercarriage units are all interchangeable between port and starboard sides. The aircraft is made from a number of jig-built metal components assembled by simple joints so that they can be rapidly dismantled for servicing, for shipment or to replace a damaged unit.

40 YEARS AGO

Palmer Bros., of Mianus, Conn., the well-known manufacturers of marine gasoline motors, are placing on the market a twin vertical carriage motor on the same principle as their marine motors — i.e., the two-cycle principle, giving an impulse every revolution.

This new motor gives full 3 b.h.p., weighs 260 lb., has cylinders 3½ in. in diameter and a stroke also of 3½ in., and is reversible. Water is used to cool the cylinders.

From *The Horseless Age*, November, 1899.

Little Use of Black On the 1940 Models

That little use has been made of black finishes on this year's cars is noted in a study of color treatments made at the New York Automobile Show by Howard Ketcham, color engineer and consultant for E. I. duPont de Nemours & Co. Gray, says Mr. Ketcham, is the most important new color note predicted for this year's models by leading automobile producers. Next in order of importance come blue, green, maroon, brown, black, cream, and white.

Harry Lindberg

Harry Lindberg died recently in Detroit. He was for several years production manager for Cadillac Motor Car Co. and later was plant manager for Fisher Body Corp. at St. Louis. More recently he had been sales engineer for Motor Products Corp.

1940 Price Comparison

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln-Zephyr, Mercury and Willys.

Make and Model	Body Type and No. of Doors	Delivered Price at Factory
Under $500		
Crosley	Conv. Coupe	$337
Crosley	Conv. Sedan, 2d.	362
Bantam	Standard Coupe	399
Bantam	Master Coupe	449
Bantam	Master Roadster	449
Willys, Speedway	Coupe	495
$500 to $749		
Bantam	Conv. Coupe	$525
Willys, Speedway	Sedan, 4d.	545
Bantam	Conv. Sedan, 2d.	549
Bantam	Station Wagon	575
Willys, DeLuxe	Coupe	590
Ford, V8-60	Coupe	600
Ford, V8-60	Business Coupe	620
Willys, DeLuxe	Sedan, 4d.	620
Ford, V8-60	Tudor Sedan, 2d.	640
Ford, V8-85	Coupe	640
Plymouth, Roadking	Coupe	645
Chevrolet, Master 85	Business Coupe	659
Ford, V8-85	Business Coupe	660
Studebaker, Cust. Champ.	Coupe	660
Hudson, Traveler Six-40	Coupe	670
Ford, V8-85	Tudor Sedan, 2d.	680
Chevrolet, Master DeL.	Business Coupe	684
Ford, V8-60	Fordor Sedan, 4d.	685
Studebaker, Cust. Champ.	Coupe, 2-4p.	695
Chevrolet, Master 85	Town Sedan, 2d.	699
Plymouth, Roadking	Tour. Sedan, 2d.	699
Ford, V8-85, DeLuxe	Coupe	700
Studebaker, Cust. Champ.	Club Sedan, 2d.	700
Studebaker, DeL. Champ.	Coupe	705
Chevrolet, Master DeL.	Sport Sedan, 4d.	715
Chevrolet, Special DeL.	Business Coupe	720
Ford, V8-85, DeLuxe	Business Coupe	720
Chevrolet, Master DeL.	Town Sedan, 2d.	725
Ford, V8-85	Fordor Sedan, 4d.	725
Plymouth, DeLuxe	Coupe	725
Hudson, Traveler Six-40	Sedan, 2d.	735
Chevrolet, Master 85	Sport Sedan, 4d.	740
Ford, V8-85, DeLuxe	Tudor Sedan, 2d.	740
Plymouth, Roadking	Tour. Sedan, 4d.	740
Studebaker, Cust. Champ.	Cruising Sedan, 4d.	740
Studebaker, DeL. Champ.	Coupe, 2-4p.	740
Hudson, DeLuxe Six-40	Coupe	745
Studebaker, DeL. Champ.	Club Sedan, 2d.	745
$750 to $999		
Chevrolet, Special DeL.	Coupe, 4p	$750
Hudson, Traveler Six-40	Victoria Coupe	750
Dodge Special, D-17	Coupe	755
Chevrolet, Special DeL.	Town Sedan, 2d.	761
Hudson, Traveler Six-40	Sedan, 4d.	763
Plymouth, DeLuxe	Coupe	770
Hudson, DeLuxe Six-40	Sedan, 2d.	775
Plymouth, DeLuxe	Tour. Sedan, 2d.	775
Pontiac, Special Six	Coupe	783
Ford, V8-85, DeLuxe	Fordor Sedan, 4d.	785
Studebaker, DeL. Champ.	Cruis. Sedan, 4d.	785
Hudson, DeLuxe Six-40	Victoria Coupe	791
Nash, LaFayette	Business Coupe	795
Chevrolet, Special DeL.	Sport Sedan, 4d.	802
Dodge, DeLuxe D-14	Coupe	803
Plymouth, DeLuxe	Tour. Sedan, 4d.	805
Hudson, DeLuxe Six-40	Sedan, 4d.	806
Oldsmobile, Six-60	Business Coupe	807
Hudson, Super Six-41	Coupe	809
Dodge, Special, D-17	Sedan, 2d.	815
Pontiac, Special Six	Sport Coupe	819
Ford, V8-85, DeLuxe	Conv. Club Coupe	825
Pontiac, Special Six	Tour. Sedan, 2d.	830
Pontiac, DeLuxe Six-26	Business Coupe	835
Hudson, Super Six-41	Sedan, 2d.	839
De Soto, DeLuxe	Business Coupe	845
Nash, LaFayette	Sedan, 2d.	845
Oldsmobile, Six-60	Club Coupe	848
Ford, V8-85	Station Wagon	850
Nash, LaFayette	A. P. Coupe	850
Oldsmobile, Six-60	Sedan, 2 d.	853
Dodge, Special D-17	Sedan, 4d.	855
Dodge, DeLuxe D-14	Coupe	855
Dodge, DeLuxe D-14	Sedan, 2d.	860
Hudson, Super Six-41	Victoria Coupe	860
Hudson, Eight-44	Coupe	860
Oldsmobile, Six-70	Business Coupe	865
Packard, Six-1800	Business Coupe	867
Hudson, Super Six-41	Sedan, 4d.	870
Chevrolet, Special DeL.	Cabriolet, 2d.	873
Nash, LaFayette	Sedan 4d	875
Nash, LaFayette	Sedan, trk., 4d.	875
Pontiac, DeLuxe 8-28	Business Coupe	875
Pontiac, Special Six	Tour. Sedan, 4d.	876
Pontiac, DeLuxe Six-26	Sport Coupe	876
Pontiac, DeLuxe Six-26	Tour. Sedan, 2d.	881
De Soto, Custom	Coupe	885
Buick, Special 40	Business Coupe	895
Chrysler, Royal Six	Coupe	895
Studebaker, Comm. 6	Coupe	895
Oldsmobile, Six-60	Sedan, 4d	899
Oldsmobile, Six-70	Club Coupe	901
De Soto, DeLuxe	Coupe	905
De Soto, DeLuxe	Tour. Sedan. 2d.	905
Dodge, DeLuxe D-14	Sedan, 4d.	905
Oldsmobile, Six-70	Tour. Sedan, 2d.	912
Pontiac, DeLuxe 8-28	Sport Coupe	913
Hudson, Eight-44	Sedan, 2d.	918
Pontiac, DeLuxe 8-28	Tour. Sedan, 2d.	919
Ford, V8-85 DeLuxe	Station Wagon	920
Mercury	Sedan, 2d.	920
Packard, Six-1800	Club Coupe	924
Studebaker, Comm. 6	Club Sedan, 2d.	925
Nash, Ambassador 6	Business Coupe	925
Hudson, DeLuxe Six-40	Conv. Coupe	930
Pontiac, DeLuxe Six-26	Tour. Sedan, 4d.	932
Chrysler, Windsor Six	Coupe	935
Hudson, Eight	Victoria Coupe	942
Packard, Six-1800	Tour. Sedan, 2d.	944
De Soto, DeLuxe	Tour. Sedan, 4d.	945
De Soto, Custom	Coupe	945
De Soto, Custom	Tour. Sedan, 2d.	945
Buick, Special 40	Sport Coupe	950
Hudson, Eight-44	Sedan, 4d.	952
Buick, Special 40	Tour. Sedan, 2d.	956
Hudson, DeLuxe Six-40	Conv. Sedan, 2d.	955
Nash, Ambassador 6	Sedan, 2d.	955
Chrysler, Royal Six	Coupe	960
Chrysler, Royal Six	Victoria Sedan	960
Mercury	Sedan Coupe	960
Mercury	Town Sedan, 4d.	960
Nash, Ambassador 6	A. P. Coupe	960
Oldsmobile, Six-70	Tour. Sedan, 4d.	963
Graham, DeLuxe	Sedan, 2d.	965
Studebaker, Comm. 6	Cruis. Sedan, 4d.	965
Pontiac, DeLuxe 8-28	Tour. Sedan, 4d.	970
Nash, LaFayette	A. P. Cabriolet	975
Packard, Six-1800	Tour. Sedan, 4d.	975
De Soto, Custom	Tour. Sedan, 4d.	985
Nash Ambassador 6	Sedan, 4d.	985
Nash, Ambassador 6	Sedan, trk., 4d.	985
Chrysler, Royal Six	Sedan	995
Chrysler, Windsor Six	Coupe	995
Chrysler, Windsor Six	Victoria Sedan	995
Graham, DeLuxe	Sedan, 4d.	995
Graham, DeLuxe	Comb. Coupe, 2d.	995
Hudson, Super Six-41	Conv. Coupe	995
Buick, Special 40	Tour. Sedan, 4d.	996
Oldsmobile, Six-60	Conv. Coupe	996
$1000 to $1499		
Pontiac, DeLuxe Six-26	Cabriolet	$1003
Pontiac, Special Six	Station Wagon	1015
Pontiac, Torpedo 8-29	Sport Coupe	1016
Hudson, C. C. 6-43	Sedan, 4d.	1018
Chrysler, Windsor Six	Sedan	1025
Studebaker, President 8	Coupe	1025
Hudson, Super Six-41	Conv. Sedan, 2d.	1030
Packard, Eight 120-1801	Business Coupe	1038
Oldsmobile, Six-70	Conv. Coupe	1045
Pontiac, DeLuxe 8-28	Cabriolet	1046
Mercury	Club Convertible	1050
Studebaker, President 8	Club Sedan, 2d.	1055
Buick, Super 50	Sport Coupe	1058
Oldsmobile, Cust. 8 Cruiser	Club Coupe	*1069
Pontiac, Torpedo 8-29	Tour. Sedan	1072
Buick, Special 40	Conv. Coupe	1077
Nash, Ambassador 6	A. P. Cabriolet	1085
Hudson, Eight	Conv. Coupe	1087
Packard, Six-1800	Conv. Coupe	1087
Chrysler, Traveler 8	Coupe	1095
Dodge, DeLuxe-D-14	Sedan, 4d	1095
Packard, Eight 120-1801	Club Coupe	1095
Studebaker, President 8	Cruis. Sedan, 4d.	1095
Graham, DeL. Superch.	Sedan, 2d.	1100
Graham, Custom	Sedan, 2d.	1100
Buick, Super 50	Tour. Sedan, 4d.	1109
Packard, Eight 120-1801	Tour. Sedan, 2d	1115
Hudson, C. C. 8-47	Sedan, 4d.	1118
Hudson, Eight-44	Conv. Sedan, 2d.	1122
Graham, DeL. Superch.	Sedan, 4d.	1130
Graham, DeL. Superch.	Comb. Coupe	1130
Graham, Custom	Sedan, 4d.	1130
Graham, Custom	Comb. Coupe, 2d.	1130
Oldsmobile, Cust. 8 Cruiser	Tour. Sedan, 4d.	*1131
Nash, Ambassador 8	Business Coupe	1135
Packard, Eight 120-1801	Tour. Sedan, 4d.	1146
Chrysler, Traveler 8	Coupe	1150
Chrysler, Traveler 8	Victoria Sedan	1150
Chrysler, Windsor Six	Conv. Coupe	1160
Nash, Ambassador 8	Sedan, 2d.	1165
Dodge, DeLuxe D-14	Limousine, 7p	1170
Nash, Ambassador 8	A. P. Coupe	1170
Chrysler, New Yorker 8	Coupe	1175
De Soto, DeLuxe	Tour. Sedan, 4d.	1175
Chrysler, Traveler 8	Sedan	1180
Mercury	Conv. Sedan	1180
Nash, Ambassador 8	Sedan, 4d.	1195
Nash, Ambassador 8	Sedan, trk., 4d.	1195
Buick, Century 60	Tour. Sedan, 4d.	1211
De Soto, Custom	Tour. Sedan, 4d.	1215
Packard, Eight 120-1801	Club Sedan, 4d.	1217
Chrysler, New Yorker 8	Coupe	1230
Chrysler, New Yorker 8	Victoria Sedan	1230
Hudson, C. C. 6-43	Sedan, 4d., 7p.	1230
Chrysler, Royal Six	Sedan	1235
Graham, Cust. Superch.	Sedan, 2d.	1235
La Salle, Series 50	Coupe	1240
Packard, Eight 120-1801	Conv. Coupe	1258
Chrysler, New Yorker 8	Sedan	1260
Graham, Cust. Superch.	Sedan, 4d.	1265
Graham, Cust. Superch.	Comb. Coupe	1265
Chrysler, Windsor Six	Sedan	1276
Buick, Roadmaster 70	Sport Coupe	1277
La Salle, Series 50	Tour. Sedan, 2d.	1280
De Soto, Custom	Limousine, 7p.	1290
Nash, Ambassador 8	A. P. Cabriolet	1295
Chrysler, Royal Six	Limousine, 7p.	1310
La Salle, Series 50	Tour. Sedan, 4d.	1320
Hudson, C. C. 8-47	Sedan, 4d., 7p.	1330
Buick, Century 60	Conv. Coupe, 2d.	1343
Chrysler, Windsor 6	Limousine, 7p.	1350
Buick, Special 40	Conv. Phaeton, 4d.	1355
Buick, Roadmaster 70	Tour. Sedan, 4d.	1359
Lincoln-Zephyr	Coupe	1360
Chrysler, New Yorker 8	Conv. Coupe	1375
Chrysler, Saratoga 8	Sedan	1375
La Salle, Series 52	Coupe	1380
La Salle, Series 50	Conv. Coupe	1395
Lincoln-Zephyr	Club Coupe	1400
Lincoln-Zephyr	Sedan, 4d.	1400
La Salle, Series 52	Tour. Sedan, 4d.	1440
$1500 to $1999		
Packard, Super 8-1803	Business Coupe	1524
Packard, Eight 120-1801	Conv. Sedan	1550
Buick, Limited 80	Tour. Sedan, 4d	1553
Packard, Super 8-1803	Club Coupe	1595
Buick, Century 60	Conv. Phaeton, 4d.	1620
Packard, Super 8-1803	Tour. Sedan, 4d.	1632
Cadillac, Series 62	Coupe	1685
Packard, Super 8-1803	Club Sedan, 4d.	1717
Buick, Limited 80	Formal Sedan, 4d.	1727
Lincoln-Zephyr	Limousine	1740
Cadillac, Series 62	Tour. Sedan, 4d	1745
Lincoln-Zephyr	Conv. Coupe	1770
Packard, Super 8-1803	Conv. Coupe	1775
La Salle, Series 50	Conv. Sedan	1800
Packard, Super 8-1804	Tour. Sedan, 4d.	1895
Buick, Limited 90	Tour. Sedan, 4d.	1942
Buick, Limited 80	Conv. Phaeton, 4d.	1952
$2000 to $2999		
Packard, Super 8-1805	Tour. Sedan	$2026
Packard, Super 8-1803	Conv. Sedan	2050
Cadillac, Series 60S	Tour. Sedan, 4d.	2090
Buick, Limited 90	Tour. Sedan, 4d.	2096
Packard, Super 8-1805	Tour. Limousine	2154
Buick, Limited 90	Limousine, 4d.	2199
Packard, Cust. Sup. 8-1806	Club Sedan	2228
Cadillac, Series 60S	Tour. Sedan, Div.	2230
Chrysler, Crown Imperial	Sedan	2245
Chrysler, Crown Imperial	Sedan	2345
Packard, Cus. Sup. 8-1807	Tour. Sedan	2396
Chrysler, Crown Imperial	Limousine	2445
Packard, Cus. Sup. 8-1808	Tour. Sedan	2526
Packard, Cus. Sup. 8-1808	Tour. Limousine	2654
Cadillac, Series 72	Tour. Sedan, 4d.	2670
Cadillac, Series 72	Bus. Tour. Sedan	2690
Cadillac, Series 72	Tour. Sedan, Div.	2740
Cadillac, Series 72	Tour. Sedan	2785
Cadillac, Series 72	Bus. Tour. Imperial	2825
Packard, Cus. Sup. 8-1807	Formal Sedan	2825
Lincoln-Zephyr	Conv. Cabriolet	2840
Cadillac, Series 72	Tour. Imper. Sedan	2915
Cadillac, Series 75	Tour. Sedan, 4d.	2995
$3000 to $4999		
Cadillac, Series 75	Tour. Sedan, Div.	$3155
Cadillac, Series 75	Tour. Sedan, 7p.	3210
Cadillac, Series 75	Coupe	3280
Cadillac, Series 75	Tour. Imp. Sedan, 7p.	3360
Cadillac, Series 75	Coupe, 5p.	3380
Cadillac, Series 75	Conv. Coupe	3380
Cadillac, Series 75	Town Sedan	3635
Cadillac, Series 75	Conv. Sedan	3945
Cadillac, Series 75	Formal Sedan	3995
Cadillac, Series 75	Formal Sedan, 7p.	3995
Packard, Cus. Sup. 8-1807	Rollson Cabriolet, A.W.	4450
Packard, Cus. Sup. 8-1808	Rollson Town Car, A.W.	4575
$5000 and over		
Cadillac, Series 75	Town Car	$5115
Cadillac, Series 90	Tour. Sedan, 4d.	5140
Cadillac, Series 90	Tour. Sedan, Div.	5215
Cadillac, Series 90	Tour. Sedan, 7p.	5270
Cadillac, Series 90	Coupe, 2-4p.	5340
Cadillac, Series 90	Tour. Imp. Sedan, 7p.	5420
Cadillac, Series 90	Coupe, 5 p.	5440
Cadillac, Series 90	Conv. Coupe	5440
Cadillac, Series 90	Town Sedan	5695
Cadillac, Series 90	Conv. Sedan	6000
Cadillac, Series 90	Formal Sedan	6055
Cadillac, Series 90	Formal Sedan, 7p.	6055
Cadillac, Series 90	Town Car	7175

Mild Mark-Up of Prices in 1940 for Automotive Steel

Increase Said to Be Inevitable Despite Anxiety Of Mills to Encourage Use of More Steel per Car

Unless there should be a sudden change in basic conditions, automobile manufacturers will pay more in 1940 for the steel contained in each of their finished units than they did this year, but the increase is likely to be exceedingly moderate. With some of the 1940 models entailing the use of more steel per car than this year, the steel industry is especially anxious to avoid doing anything that might change this trend. But a mild mark-up in steel prices is accepted as inevitable under prevailing circumstances.

Although scrap prices give every indication of easier market conditions, steel-making materials are generally higher than they were at the time when prevailing selling prices for steel went into effect. Moreover, prices of steel, other than those of sheets and strip steel, of which automobile manufacturers and parts makers are the principal consumers, are subject to the influence of miscellaneous industrial demand, just now very much in the limelight, but ordinarily a minor factor, and of quasi-speculative commitments.

Conflicting statements with reference to the British attitude toward American tin consumers emanate from London. The latest of these is that permission has been granted to British companies to resell tin in the United States "at reasonable margins" over the maximum prices fixed by the British government for the United Kingdom and the Straits Settlements. Previously received information was to the effect that there was considerable uneasiness, if not indignation, over the price for tin, which American consumers were called upon to pay as the result of manipulation. The maximum price of Straits tin in London is the equivalent of 41 cents. Here 55 cents is quoted, or more than $300 per gross ton over the London maximum price. Prices for future deliveries range from 46 to 52 cents.

Mine and refinery production of copper have been stepped up to keep pace with the demand of the Connecticut brass mills, which are operating at capacity. The market continues firm with 12½ cents quoted for spot electrolytic. Resellers are asking $1 per ton premium.—W. C. H.

New Case Tractor

New Flambeau Red tractor models of the J. I. Case Co. were recently released to dealers all over the country. Higher position of the seat and steering wheel, together with a large non-skid platform for permitting operator to run the tractor from a standing as well as sitting position, are features.

Oil pressure gage, engine temperature gage, radiator shutter control and speed control lever are grouped on the steering post of the new models. A hand-operated clutch lever also controls the pulley brake. The new series is equipped with auto-type gear shift levers.

All oil passages are drilled in solid metal, including new provision for positive pressure oiling to valve rocker arms and push rods. The pump intake strainer has greater capacity for certainty of lubrication under extreme temperature conditions.

The tractors are provided with a new fourth gear which, with rubber tires, gives from 2 to 10 m.p.h. at rated engine speed. On steel wheels the four gears give speeds of 2¼, 3¼, 4½ and 9 m.p.h.

LESS CHANCE OF

WHEN YOU USE NEOPRENE-JACKETED HORN WIRE

HERE'S an opportunity to get some extra business and do your customers a favor at the same time. Check every car that comes in, and replace worn horn wire with wire insulated with Du Pont *neoprene*.

Neoprene insulation is the newest, safest thing in horn wire. It cuts to a minimum those embarrassing shorts that happen when ordinary insulation wears out. Because neoprene resists the oil, heat, ozone and other things that make ordinary insulation go bad. It keeps the current inside, where it belongs, far longer than any other horn wire you've ever seen!

Order neoprene-insulated horn wire from your regular supplier. Or clip the handy coupon for a list of manufacturers. E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington, Delaware.

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E. I. du Pont de Nemours & Co. (Inc.)
Rubber Chemicals Div., Wilmington, Del.

I am interested in knowing more about *neoprene*-covered horn wire. Please send me a list of manufacturers.

*Name*_____

*Address*_____

*City*_____

*State*_____

PUBLICATIONS

Bulletin 839, published by the Michiana Products Corp., Michigan City, Ind., describes and illustrates the complete line of Michiana and H-W Duo-Flo Type **oil filters** for use on gasoline and Diesel engines.*

Hollow screw products, manufactured by the Allen Mfg. Co., Hartford, Conn., are described in the company's catalog No. 39.*

R. G. Haskins Co., Chicago, has prepared a booklet covering its line of **high-speed tapping machines.***

The Wheelco **surface temperature pyrometer,** Series 2850, is the subject of Bulletin No. 2850-1 published by Wheelco Instruments Co., Chicago.*

A review of the various methods of **applying lacquers and enamels to metal products** has been published by Maas & Waldstein, Newark, N. J.*

Jessop Steel Co., Washington, Pa., has issued a new wall chart which gives the specifications for its **rolled composite die sections** used in dies for cutting sheet metal to regular or irregular shapes.*

Howard Ketcham, Inc., has published a booklet on color and design engineering discussing **color and light in their relation to sales.***

A catalog, illustrating and describing 18 standard types of **aluminum ladders and stages,** has been issued by Aluminum Ladder Co.*

General Electric has published a booklet entitled **"Little-known GE Products for Industry."***

General Electric has also published a booklet on how to select **protective devices for low-voltage power circuits.***

Young Radiator Co. has published two catalogs. One illustrates its complete **line** of **evaporators** to be used in cooling and air conditioning equipment; the other illustrates its latest line of Streamaire **convectors.***

Catalog 1339 of Stephens-Adamson Mfg. Co. contains revised information on the company's **car pullers, hoists and sheaves of standard design**—plus information on certain hand and motor operated winches. Included are the new No. 14 wire rope car puller, and a new section on rope for S-A car pullers.*

Service bulletin No. 13 of the Rubber Manufacturers Association contains information regarding **over-inflation in truck tires.***

A question and answer bulletin has been prepared by AGA Metal Tube Co. on its new **Agalloyed steel tubing.***

Dearborn Chemical Co. has published two catalogs. One covers the Dearborn line of **cleaners** for every purpose; the other covers its NO-OX-ID **rust-preventative.***

Truck Equipment Co. recently published a booklet—"The Origin and Development of Transportation—Causes of Obsolescence and Factors Producing Modern Vehicles," The book was written to convey the transportation possibilities available through modern **spring suspensions.***

American Chemical Paint Co. has published a bulletin on KEMICK, a **chemical paint for surfaces subjected to high temperatures.***

"How to Cut Maintenance Costs" is the title of a new folder by Flexrock Co. The folder concerns Ruggedwear **floor resurfacer.***

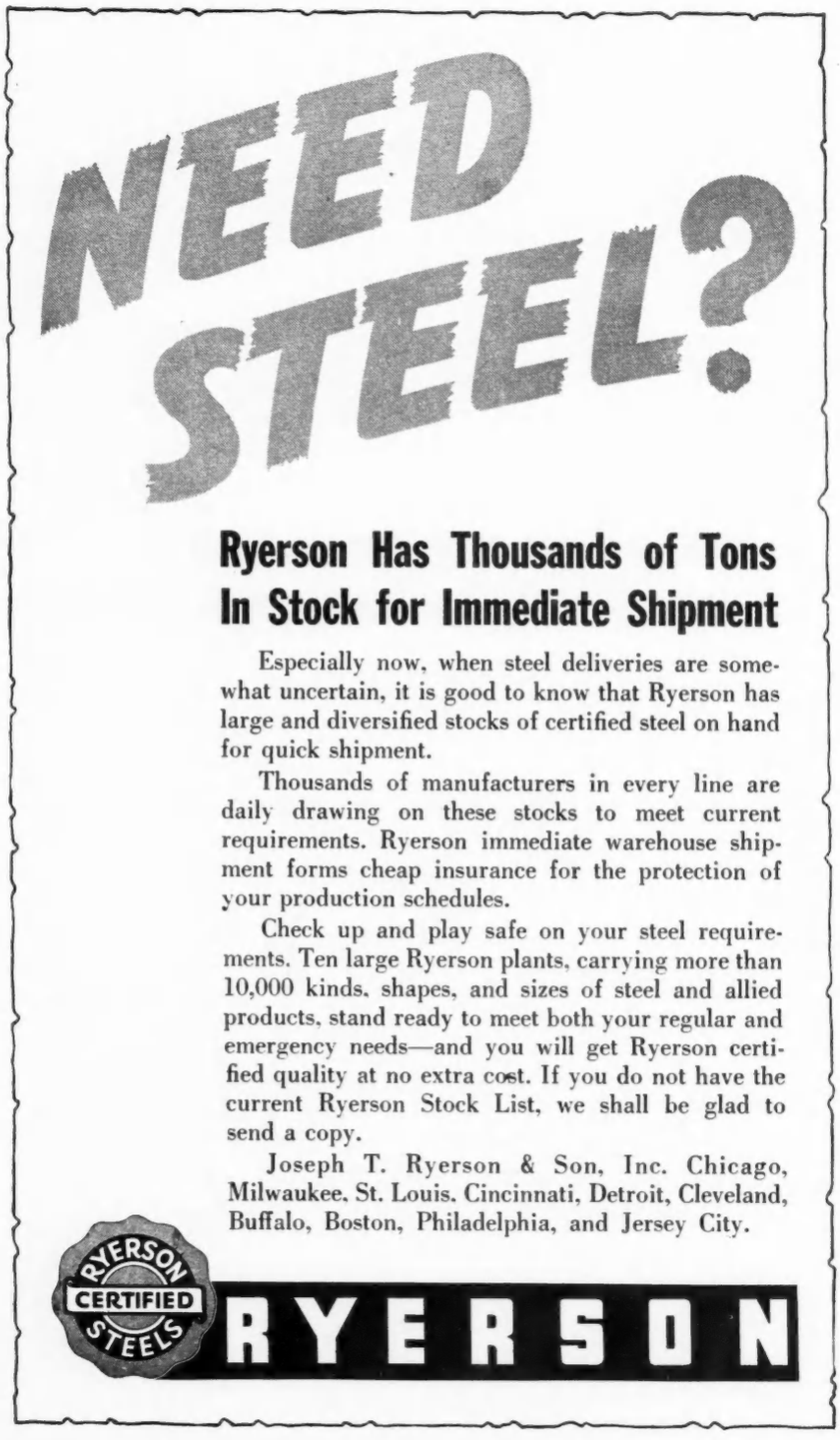
"Highway Transportation Re-makes America" is the title of the latest booklet published by the National Highway Users Conference.*

Latest bulletin by Stephenson-Adamson Mfg. Co. concerns its Tellevel **automatic storage control.***

Brown Instrument Co. has just released a booklet announcing a new line of **thermometers and pressure gages.***

Special job sheet brochures have been prepared by Continental Machines, Inc., Minneapolis, Minn. These manuals give detailed information about the Doall **contour metal shaping machine** manufactured by the company and its specific application in automotive manufacture.*

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.


NEED STEEL?
Ryerson Has Thousands of Tons In Stock for Immediate Shipment
Especially now, when steel deliveries are somewhat uncertain, it is good to know that Ryerson has large and diversified stocks of certified steel on hand for quick shipment.
Thousands of manufacturers in every line are daily drawing on these stocks to meet current requirements. Ryerson immediate warehouse shipment forms cheap insurance for the protection of your production schedules.
Check up and play safe on your steel requirements. Ten large Ryerson plants, carrying more than 10,000 kinds, shapes, and sizes of steel and allied products, stand ready to meet both your regular and emergency needs—and you will get Ryerson certified quality at no extra cost. If you do not have the current Ryerson Stock List, we shall be glad to send a copy.
Joseph T. Ryerson & Son, Inc. Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, and Jersey City.
RYERSON CERTIFIED STEELS
RYERSON

Auburn Claims Allowed

Claims totaling more than $176,000 against Auburn Automobile have been allowed by William B. Duff, special master in chancery and approved by Federal Judge Thomas W. Slick. The Auburn company is now in the process of reorganization under the Federal bankruptcy act. Included in the claims allowed are $63,460 to Columbia Axle; $13,028 to American Rolling Mill; $13,441 to U. S. Department of Internal Revenue, cut from $27,026; $5,101 to

Indiana gross income tax division, cut from original claim of $64,046; $7,248 to Lycoming.

Employment at A. O. Smith Highest in Two Years

Expanding automobile frame business has resulted in increased payrolls for the A. O. Smith Corp., Milwaukee, company officials report. On Oct. 1, employment had increased to approximately 4700 persons, the highest level in at least two years, and nearly 1000 more than were employed by the firm in mid-September.

Rim Inspections

Rims inspected and approved by the Tire and Rim Association in September, 1939, numbered 1,585,300—as compared with 819,089 in September, 1938. Nine months of 1939 showed an increase of more than 50 per cent in rims inspected and approved over the same period in 1938.

W. C. Acklin

W. Collord Acklin, 51, president of the Acklin Stamping Co. and last of three brothers who, with their father, founded the company in 1911, died Oct. 9 after an illness of two years.

Fred A. Busse

Fred A. Busse, assistant service manager of the Timken-Detroit Axle Co., Detroit, died on Oct. 11. Mr. Busse had been associated with Timken for the past 20 years.

CALENDAR

Conventions and Meetings

SAE Fuels & Lubricants Meeting, Mayo Hotel, Tulsa, Okla.....Nov. 2-3
National Wheel & Rim Association, Jacksonville, Fla. .....Nov. 6-8
American Finance Conference, Sixth Annual Business Convention, Palmer House, Chicago .....Nov. 8-9
American Petroleum Institute, Annual Meeting, Chicago .....Nov. 13-17
National Independent Traffic League, Annual Meeting, Chicago....Nov. 23-24
Motor & Equipment Wholesalers Association, Annual Convention, Chicago .....Dec. 3-9
Motor & Equipment Manufacturers Association, Annual Meeting, Chicago .....Dec. 12
SAE Annual Meeting & Engineering Display, Book-Cadillac Hotel, Detroit ....Jan. 5-19, 1940
American Road Builders' Association, Convention, Chicago.Jan. 29-Feb. 2, 1940

Shows at Home and Abroad

San Francisco, Cal., Automobile Show, Nov. 3-9
Chicago, Ill., Automobile Show...Nov. 4-12
National Truck Show, Chicago...Nov. 8-16
Great Britain, Glasgow, Scotch Automobile Show .....Nov. 10-18
Butte, Mont., Automobile Show....Dec. 4-5
Automotive Service Industries Show, Navy Pier, Chicago .....Dec. 11-16

Stewart Equipment for Chinese Truck Plant

Equipment recently purchased by the Universal Trading Corp. of New York, buying agent of the Chinese government, from the defunct Stewart Motor Corp. of Buffalo, is being shipped to China where it will be used to manufacture trucks, according to word received in Buffalo from S. D. Ren, executive vice-president of the Universal Trading firm.

"We are planning to establish a new plant for the manufacture of trucks," Mr. Ren said, "and when it is completed the equipment purchased from Stewart will be used there. In all probability, the plant will be built in Kunming, but as the details of our plan have not yet been worked out, some other site may be chosen before we actually begin to build."

Donaldson Co., Inc., Opens Detroit Branch

Donaldson Co., Inc., St. Paul, Minn., manufacturer of oil-washed air cleaners, has opened a branch office in Detroit. The Detroit representative is Arthur C. Cragg.

"These Low Cost Drill Presses Are Saving My Hide"...

$89.50
with motor pulley and belt but without motor.

Because they not only enable me to cut costs—but I can get them NOW—without waiting months for delivery!"

Manufacturers everywhere are telling us the same story—of how Delta drill presses are giving them an edge on competition.

We have scores of dramatic illustrations of this in our files. Here's why: Delta Drill Presses cut labor costs, increase flexibility, save on special set-ups. They give you durable precision machines at a fraction of the cost of heavy machines. For instance: The unit here illustrated gives you

MANY SPECIAL FEATURES

Five speeds; 385, 600, 935, 1450, 2240 R.P.M. Floating Drive; Preloaded double-seal ball bearings; 16 tooth splined spindle; Table Raising gear; Head-Raising gear; Tilting or production table; Completely enclosed belt; Safety spring wind; Foot power feed. Overall dimensions 66" high; 18" wide; 27" front to rear. Tilting table 11" x 12". Production table 12½" by 17" surface. Floor base 10" by 13¾" table surface. Shipping weight 340 lbs.

Separate drill press heads available. Also high speed bench models and 2 spindle models.

SEND FOR DRILL PRESS BOOK

Mail coupon for latest Delta Drill Press Book. It contains specifications and prices of complete line of Delta Drill Presses plus details on individual parts from which you can make your own low-cost assemblies.

DELTA
MANUFACTURING CO.
(INDUSTRIAL DIVISION)
666 E. VIENNA AVE.
MILWAUKEE, WISCONSIN

Delta Mfg. Co. (Industrial Division)
666 E. Vienna Avenue—Milwaukee, Wis.

Gentlemen: Please send me your latest Delta Drill Press book which contains specifications and prices of your complete line of Drill Presses.

Name .....
Address .....City..... State.....

Newest Labor Headache Is Known as the "Slow-Down"

Latest CIO-UAW Tactics Compel Many Automobile Plants to Cease Operations

Labor difficulties which forced almost all divisions of the Chrysler Corp. to suspend production during a large part of October, and which also threw employes of several supplying manufacturers out of work, saw the UAW-CIO employing new forms of sitdown tactics which are labeled the "slow-down."

In evidence since the beginning of the new model production season, according to Chrysler officials, the "slow-down" on Oct. 6 had reached such serious proportions in the main Dodge plant that the company was forced to suspend production in that plant, and although opened for work on succeeding days men were sent home shortly after reporting because the slow-down continued. Difficulties reached actual strike proportions on Oct. 17, after members of the union had authorized calling a strike, and the plant was surrounded by large bodies of pickets. Meanwhile, because the Dodge plant supplied parts to most other Chrysler divisions most plants in these divisions also were obliged to close because of lack of materials, while plants of the Briggs Mfg. Co. supplying Chrysler divisions with bodies also had to suspend operations, and a large body of employes of the Electric Auto-Lite Co. in Toledo had to be laid off.

Closing of the Dodge plants, and other Chrysler plants, preceded the opening of negotiations for a new contract between the UAW-CIO and the corporation and disputes over the "slow-down" continued after contract negotiations had started giving support to the contention expressed in some quarters that an issue had to be raised for their effect on contract negotiations.

Early meetings between union and corporation representatives involving negotiations for the new contract, which began while the "slow-down" dispute was still in progress, found both sides stalemated over two principal union demands: (1) A joint voice in the establishment of production standards, and (2) adoption of the "union" shop.

The "Union Shop" proposal which has been advocated by the UAW-CIO in most of its recent contract negotiations offers an interesting study in the use of words to differentiate it from the better known "closed shop." Under the "union shop" the employer is permitted to hire non-union workers with the requirement, however, that these workers join the union within 30 days or some other specified time whereas the "closed shop" usually permits employment only of union members. Difference between the two terms depends entirely on interpretation.

A strike which had kept the Kenosha, Wis., plant of the Nash-Kelvinator Corp. closed since Oct. 1 and had halted production of finished Nash cars since that time was amicably settled by agreement between the company and the UAW-CIO on Oct 19.

Boom Times

(*Continued from page* 501)

those of American steamship companies, and that any withdrawal of American bottoms from belligerent waters would not seriously affect rubber supplies.

The National Association of Independent Tire Dealers at its annual convention in San Francisco elected M. U. Moseley of Miami, Fla., as president to succeed W. J. Coughlin of Indianapolis. Frank Hawkins of Seattle, Wash., is the new vice-president with George J. Burger of New York, continued as secretary-manager.

USE
DURO DRILL PRESSES
FOR LOW COST
PRECISION WORK

Modern manufacturing methods require precision operation at high speeds to maintain a constant flow of parts to production lines. Many plants are installing Duro Precision Ball Bearing Drill Presses because of their low initial cost and low maintenance cost PLUS large capacity, accuracy and dependability.

Made by the Manufacturers of America's Finest and Most Complete Line of Power Driven Machinery.

DURO METAL
PRODUCTS COMPANY
Dept. PT-11, 2663 N. Kildare Ave.
Chicago, Illinois

Duro's years of experience in building first quality electric drills assures the maximum in performance and dependability.

Duro Drills are powered by General Electric Universal Motors that will run continuously under maximum load without stalling. New Departure Ball Bearings, double reduction helical cut gears of chrome vanadium steel and Jacobs Keyed Chucks are only a few of their many superior features.

A complete range of sizes from 1/4" Utility to 3/4" Standard.

Send for your copy of the catalog describing the complete line of Duro precision-built tools.

Step Up
PRODUCTION
With DURO Tools

CONTINENTAL MOTORS

(*Continued from page* 495)

other is a multiple-lot line, tooled to handle five different rods.

Cylinder heads are produced in a section containing five different lines. One of these is a special high production line for a single customer. Of the others, two are tooled for overhead engines, one for a large L-head engine, another for miscellaneous heads for small fours and sixes. A typical routing for an overhead valve cylinder head is reproduced to illustrate the type of equipment that will be found in this department (see page 494).

Flywheel housings are machined on one of two parallel lines provided with flexible equipment and tooling to cover the entire range of engines.

Flywheels are machined in a self-contained department provided with a number of individual lines, one of these being a single-purpose high production set-up for a special customer. Busiest line in this department is a completely universal set-up capable of handling eight different styles of wheels. Each of the turning machines on this line is fitted with a universal chuck provided with interchangeable chuck jaws which take care of the entire range of diameters. In addition, each machine is fitted with a universal tool block which can be re-set and re-tooled for each job.

Completing the major facilities of the machine shop is a large screw machine department, accounting for the production of all manner of screw machine parts. This, in turn, is supplemented by a self-contained department called the "second operation" department in which the screw machine parts are finished by various means such as grinding, tapping, etc.

In addition to the foregoing, the plant has its own tool room with facilities for producing much of the tooling, jigs, and fixtures required by the machine shops. Too, there is a complete heat treating department fully equipped to handle the heat treating of gears, camshafts, and other parts.

Discussion of machine shop operations may well be rounded out by noting the routing of an aircraft engine cylinder barrel, typical of the set-up for producing the small engines.

Returning for a moment to the power-driven final assembly power conveyor, it is of interest to note that the assembly line curves so as to subtend two sides of the department, encompassing the machine lines within its boundaries. At the end of the line, the finished engines are hoisted onto an overhead conveyor which transports them to the block test. The principle of flexibility and universality so basic to an operation of this character extends even to the block test department where each of the test stands is of universal design, large enough to accommodate the larger engines, yet sufficiently flexible in mounting arrangement to handle even the smallest engine.

All engines are run on the test stands for three hours, then taken to inspection benches where they are partly torn down for inspection. This operation is primarily one of removing the oil pan so as to permit inspection of the bearings. Some of the production engines are routed to the dynamometer room for a complete test schedule, for sampling break-down test. However, all heavy-duty engines which are supplied with governors are routed to the dynamometer test to certify the final governor setting.

At the present time, the final assembly line is geared to produce 32 engines per hour. The test house, accommodating the test stands and dynamometer department has a capacity of 130 engines and can schedule 260 engines over the test stands in an 8-hour day.

Looking back over the foregoing study, it may be noted that some of the

"SERVICE PROVED" OILS
Cut Costs for Vacuum Cleaner Company

Prolonging tool life—thus building efficiency and consequent profits—is the job of Service Proved Industrial Oils and the Cities Service Lubrication Engineers' Service.

The Electric Vacuum Cleaner Co., in machining more than 2,000 outer ball bearing races a day, uses Cities Service cutting oils on Gridley automatics, because they have found that these oils give them longer tool life and more economical operation.

The Cities Service Lubrication Engineers' Service will help you solve cutting oil problems. There is no charge for this consulting service. Also you may secure a new booklet on metal cutting lubrication by checking the box indicated on the coupon.

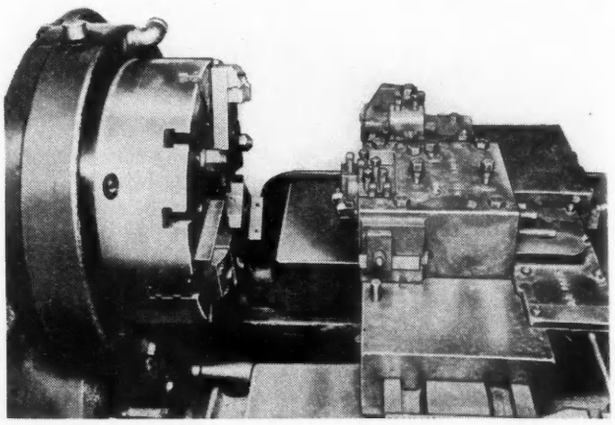
CITIES SERVICE
Cutting Oils
"SERVICE PROVED"

FREE!
Just Clip and Mail

CITIES SERVICE OIL CO.
Sixty Wall Tower—Room 1626J, New York.
☐ Please send full details of your Lubrication Engineers' Service.
☐ Please send me a copy of your free folder "Metal Cutting Lubrication."
Name..... Title.....
Business Address.....
Firm Name.....
City..... State.....

machine lines have been mentioned perhaps too sketchily. In explanation of this, we point to the fact that certain important elements of Continental engines already have been covered in detail in previous survey articles which appeared in this series, and several others will be found in later installments.

We draw the reader's attention particularly to the pictorial section which has been so selected as to afford views of many interesting corners of the Muskegon plant. We know that anyone who may be interested in a personal survey of these facilities will be welcomed by the management.



Gisholt - Simplimatic lathe with air-operated universal chuck is part of a battery of such machines found on the flywheel machine line.

WE'RE mighty careful to protect the quality of Accurate Products. It's important to us —because it's important to you. Here at the Accurate plant the policy of close inspection and rigid testing is applied to products from their raw-materials state to their finished form. Every step of manufacture involves a checkup to insure the proper development of Accurate quality. Those are the reasons why Accurate Products always meet specifications.

And there is another thing you can depend upon—it's Accurate service! Let us quote on your requirements. We believe you'll find many advantages.

COMPRESSION SPRINGS
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EXTENSION SPRINGS
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TORSION SPRINGS
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FLAT SPRINGS
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WIRE FORMS
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STAMPINGS

Send for your Free Copy of our New Handbook on Springs.

ACCURATE SPRING MANUFACTURING CO.

3811 West Lake Street • Chicago, Illinois

Reo Hearing Set For December 1

Judge Arthur F. Lederle of the U. S. District Court in Detroit has set Nov. 27 as the date for filing of final claims by creditors of the Reo Motor Car Co. under provisions of the reorganization plan recently approved by the court and now being voted upon by stockholders. Nov. 27 also was set as the date upon which stockholders' acceptance or rejection of the reorganization plan must be filed and final hearing on the plan was set for Dec. 1.

Crosley Presents Two New Models

Two additions to the Crosley line of cars have been announced, both appearing at the New York Automobile Show. The new models, a station wagon and delivery car, are priced at $445 and $350 respectively.

Crosley now offers four models for the 1940 season; the aforementioned two, a convertible coupe and a convertible sedan. The coupe and sedan are priced at $325 and $350.

Buda Opens New Branch Offices

The Buda Co., Harvey, Ill., has removed its New York office from 30 Church Street to 253 West Sixty-fourth Street. Harry W. Place, formerly of the Motive Parts Co. of America, Inc., is in charge of the New York branch.

The company has announced also the opening of similar branches at 2929 Locust Street, St. Louis, Mo., with George R. Eppes in charge; 2208 West Fort Street, Detroit, with Mr. Carsten in charge; and 19 East Twenty-fifth Street, Chicago, with George Gibson in charge.

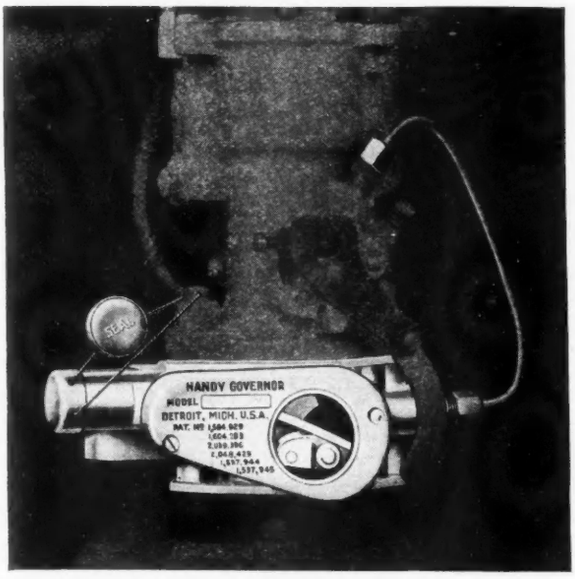
Libbey-Owens-Ford Nine Months' Profit

A net profit of $3,902,516, or $1.56 per share of stock for the nine months ended Sept. 30, has been reported by Libby-Owens-Ford Glass Co., as contrasted with $428,705 or 17 cents per share in the same period last year.

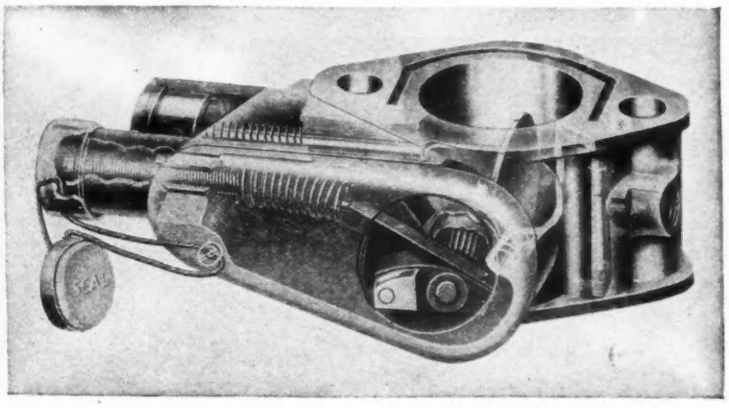
TORRINGTON NEEDLE BEARINGS

INSURE QUICK RESPONSE IN HANDY GOVERNORS

The Handy Governor is the mileage meter of the highways—quick to respond to changes in engine load.



The Handy Governor offers distinctly new features in simplicity, accuracy, and speed range.



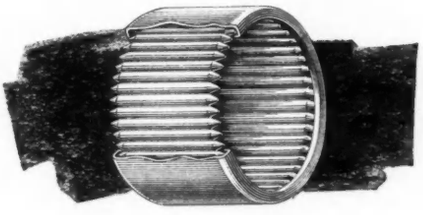
Phantom view of the Governor shows location of Torrington Needle Bearing on the throttle shaft assembly.

QUICK RESPONSE to changes in engine load is absolutely essential in the Handy Vari-Speed Governors used by leading truck manufacturers and operators everywhere. The throttle shaft assembly—one of the three moving parts in the governor—must move freely and without friction.

"To insure the absence of friction at this point," says the Handy Governor Division of King-Seeley Corporation, "our engineers selected Torrington Needle Bearings. So successful has been the use of these bearings that in many cases the operation of Handy Governors is comparable to that of mechanical governors."

Speedy response and smooth operation are not the only advantages found by Handy engineers in the use of the Torrington Needle Bearing. "There is a distinct advantage from the construction angle through the use of the Needle Bearing," reports Handy. "The bearing is so constructed that there is a great saving in vertical space and because of the bearing design we are able to use standard throttle shafts having no special shoulders."

This adaptability to product designs is characteristic of the Torrington Needle Bearing. Because of its simple construction and small diameter, it introduces no design complications; in fact, it frequently offers opportunities for simplification in the design of surrounding members, with consequent savings in space, weight, and cost.



Let the Torrington Engineering Department show you how these and other advantages of the Needle Bearing—low cost, high radial load capacity, thorough lubrication—can be incorporated in your own product designs. For further information write for catalog No. 7. For Needle Bearings to be used in heavier service request Booklet No. 103X from our associate, Bantam Bearings Corporation, South Bend, Ind.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Ball and Needle Bearings
New York Boston Philadelphia Detroit
Cleveland Chicago London, England

TORRINGTON
NEEDLE BEARING

Anti-Trust Action Against GM Under Way in South Bend

Trial May Require Three Months; Nearly 500 Witnesses to Be Heard

The government's anti-trust case against General Motors Corp. and its affiliated finance companies got under way in South Bend, Ind., on Oct. 9, with the selection of a jury in United States district court. Judge Walter C. Lindley, of Danville, Ill., is hearing the case which, according to early estimates, will run two to three months with nearly 500 witnesses to be heard.

On May 27, 1938, a grand jury in the same court returned indictments against General Motors, Ford, Chrysler, several affiliated corporations and nearly 50 officers and employes of the trio charging conspiracies in restraint of trade in violation of the Sherman anti-trust law. The "big three" were alleged to have forced and coerced their dealers into using their own, or "pet" finance companies for all their time sales paper.

Six months later, or on Nov. 18, 1938, Ford and Chrysler entered consent decrees promising to desist from further actions along the lines which had brought the indictments and the charges were subsequently quashed, but with a provision that should General Motors win its case the consent decrees would be null and void. General Motors, however, said its case was "different" from those against Ford and Chrysler and elected to go to trial.

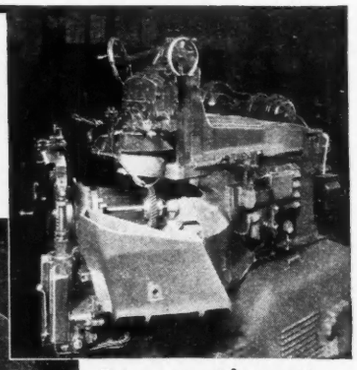
Those corporations and individuals arraigned on the opening day, with pleas of not guilty being made, were: General Motors Corp.; General Motors Sales Corp.; General Motors Acceptance Corp.; General Motors Acceptance Corp. of Indiana, Inc.; Alfred P. Sloan, Jr., chairman of General Motors board; William S. Knudsen, president of General Motors; George F. Benkhart, Chevrolet zone manager, Cleveland; M. E. Coyle, vice-president of General Motors and general sales manager of Chevrolet; James D. Deane, vice-president of GMAC; Nelson C. Dezendorf, vice-president, GMAC; August Freise, vice-president, GMAC; Richard H. Grant, vice-president, General Motors, in charge of sales; Roy Hill, Chevrolet regional manager, Dallas, Tex.; W. E. Holler, Chevrolet sales manager; W. F. Hufstader, Buick sales manager; H. J. Klingler, general manager of Pontiac; Russell Lesher, Oldsmobile zone manager, Minneapolis, Minn.; Ralph W. Moore, manager Chicago branch of GMAC; W. J. Mougey, Pontiac zone manager at Chicago; John J. Schumann, Jr., president of GMAC, and G. I. Smith, Chevrolet regional manager, Chicago. Charges against two other defendants were nolle prossed. In the case of E. W. Berger, Chevrolet zone manager, Cleveland, it was held that his immunity had been violated because of testimony he had given before a grand jury at Milwaukee which returned similar indictments in 1937 against the "big three" but which the presiding judge refused to accept. The other defendant was Arthur B. Purvis, who prosecution and defense finally agreed was "the wrong man" and not involved in the alleged conspiracy.

The charges are "something new" in the government's drive against the so-called big businesses. Whereas in the past most anti-trust cases have been civil actions, the present cases are criminal with convictions carrying a maximum jail term of one year and maximum fines of $5,000.

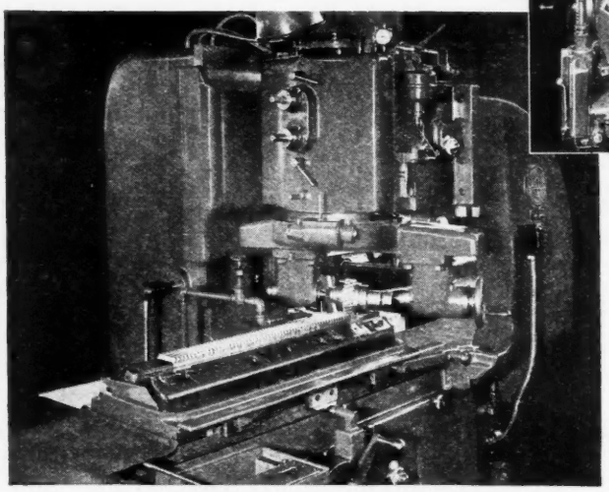
Holmes Baldridge, special assistant to the attorney-general and head of the trial section of the anti-trust division, in his opening statement to the jury set out that the prosecution would attempt to show that there was "a combination between the four corporate organizations and their officers, responsible for policies, to restrain and interfere with the right of nearly 18,000

(*Turn to page* 516, *please*)

Gauging Precision in GEAR FINISHING...



This modern **Spicer** machine performs precision teeth grinding on gears after heat treatment.



This gear shaver, machines to the correct tooth form and size before heat treating.

Spicer gears are one of the finest examples of precision gear cutting in commercial use.

BY VETERAN EXPERIENCE AND MODERN MACHINES

• Micrometers and gauges are not enough! It takes long experience in finishing methods and the latest type of precision production equipment to build fine gears. From both angles, **Spicer** facilities are unique.

Spicer not only knows how to build precision gears but has utilized this knowledge in developing better machines for finer workmanship. The first gear tooth grinding machine produced in the United States was built by Brown-Lipe in 1913. In the quarter century that followed, **Spicer** through its Brown-Lipe Division continued to design, develop and build precision grinding equipment. The two machines shown here are the last word in accurate gear finishing—years ahead for quality production.

For dependable gears, for longer service, do as so many of the leaders do—specify **Spicer**.

Spicer
SERVICE TESTED · LABORATORY TESTED

Spicer Manufacturing Corporation • Toledo, Ohio

BROWN-LIPE CLUTCHES and TRANSMISSIONS · SALISBURY FRONT and REAR AXLES · SPICER UNIVERSAL JOINTS · PARISH FRAMES READING, PA.

Use Red Cut Superior

FIRST CHOICE IN MANY GEAR CUTTING SHOPS

The steel used has to be good . . . the best, in fact . . . because the performance of the tool lies fundamentally in the steel. Tool Makers take no chances . . . they select steel of proved dependability for their products.

It is, therefore, a high tribute to the uniformity and dependability of Red Cut Superior to have it used so generally by gear manufacturers. You will find it equally dependable in every operation where high speed steel figures in the program. Our Metallurgical Department or our nearest branch office will be glad to co-operate with you.

VANADIUM-ALLOYS STEEL CO. LATROBE, PA

Anti-Trust

(*Continued from page* 514)

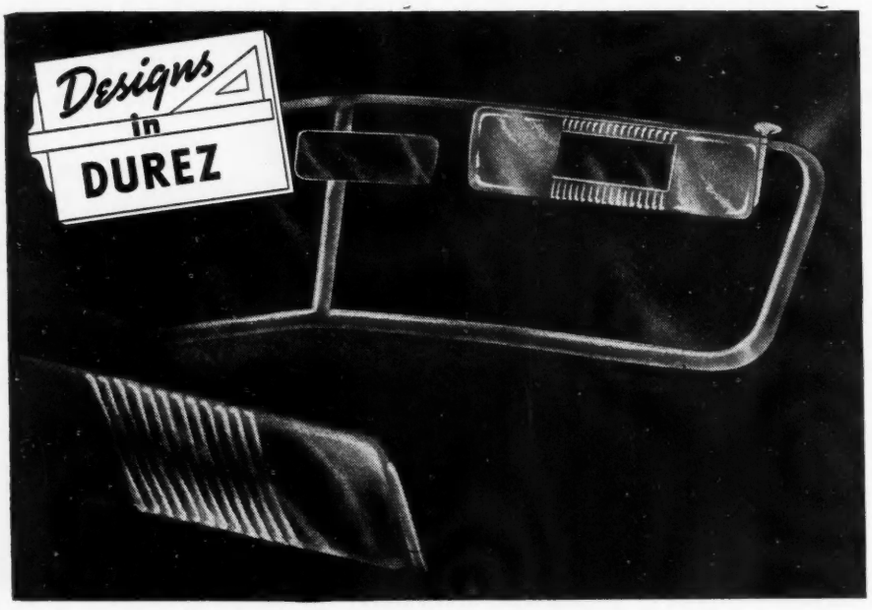
General Motors dealers to finance their sales and operate their businesses in any manner which they saw fit." He repeated on several occasions the fact that a dealer's franchise states that the dealer is not an agent or a legal representative of General Motors or GMAC but at the same time the dealers were forced to institute a General Motors bookkeeping system which was open at all times to General Motors field men and the dealers were told how much capital investment must be made, when it should be increased and what kind and size building they should occupy. All this was accomplished, he charged, through the fear by dealers of cancellation of their franchises or the putting into a territory of a competitive dealer. The latter, he said, was done on many occasions as were dealers discriminated against either by having cars forced upon them or not being able to get cars which they had ordered.

The refusal of dealers to use GMAC for their time sales paper, Baldridge contended, brought about the greater majority of these acts by the corporation against the dealer. He charged that 10 per cent of the entire net earnings of General Motors in 1938 was represented by the earnings of GMAC.

Ernest S. Ballard, of the law firm of Pope and Ballard, Chicago, made the opening statement for the defense. He outlined the formation of GMAC in 1919 and said it was organized because of the abuses connected with financing by independent finance companies. These independents, he said, would nullify any and all reductions which the manufacturers were able to make in prices of their cars and that throughout its 20 years' existence GMAC has been held out to the dealers only as a merchandising aid to General Motors. The independent finance companies, he charged, were engaging in the practice of extorting high finance charges and in many cases splitting with the dealer on the "overcharge."

"GMAC was instituted only to protect commerce in General Motors cars from burdens and obstructions," he said, "by allowing a purchaser to know exactly what the finance charges were to be before the purchase was made."

"GMAC was not started with the idea, or never had the idea of making money," he concluded.



Suggestion For a SUN VISOR

Newest automotive idea from the versatile drawing board of Joseph B. Frederico is this spirited sketch for a sun visor to be molded of lustrous Durez plastics.

Here again, a commonplace accessory, redesigned with the advantages of Durez in mind, takes on new smartness and strength. Such a sun visor has a richness of finish and refinement of detail not possible with metal and fabric. It can be made in a wide range of colors to harmonize with any interiors. It would not chip, crack or tear...and it can be made in one piece—molded and finished with integral mounting for vanity mirror—all in one operation!

Just a suggestion—but one that proves anew how easy it is to use Durez to practical advantage in your 1940 models. Write Durez Plastics & Chemicals, Inc., 911 Walck Rd., N. Tonawanda, N. Y.

DUREZ phenolic plastics—Choice of the Automotive Industry for...

- Horn buttons
- Distributor heads
- Hardware terminals
- Steering wheels
- Rotors
- Coil tops
- Window trim
- Dashboards
- Glove compartments
- Ash trays
- Cigar lighters
- Radio grilles

DUREZ PLASTICS & CHEMICALS, INC.

Plastics That Fit The Job

Eastern Photoelasticity Conference to Meet Dec. 9

The tenth semi-annual meeting of the Eastern Photoelasticity Conference will be held on Dec. 9, 1939, at Cambridge, Mass., under the auspices of the department of mechanical engineering at the Massachusetts Institute of Technology.

"Old Timers" Set Up Permanent Organization

With a buzzing of nostalgic reminiscences, nearly 300 "old-timers" of the automotive industry gathered for luncheon Oct. 18 at the Lexington Hotel and organized what is to be a permanent group to stage such affairs during future automobile shows in New York.

Stirring addresses by Dave Hennen Morris, formerly U. S. Ambassador to Belgium; Judge William H. Hotchkiss, an organizer of the American Automobile Association; Major August Post, participant in early automobile races, the Bennett Balloon races, and manager of several of the Glidden tours; Captain E. V. Rickenbacker, and other pioneer motorists conjured up scores of memories of those early days when automobiling was something of an adventure, and usually fraught with perils of blowouts, engine breakdowns, and general mechanical calamity.

Major Post and his colleagues who organized the lunch were designated by acclamation as a committee to form a permanent organization. Dr. Miller Reese Hutchinson, inventor of the Klaxon horn and numerous automotive devices, presented one of his horns, of 1906 vintage, to the organization. It will be used to call future meetings to order.